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FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
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WORK PLAN OF VALMONT SITE PREPARED UNDER

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FOR THE

HAZARDOUS SITE CONTROL DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

MAY 9, 1991

NUS CORPORATION
SUPERFUND DIVISION

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PART I INTRODUCTION

SECTION 1

VALMONT SITE
HAZLETON COUNTY, PENNSYLVANIA
EPA NO. PA-2245

1.0 AUTHORIZATION

The United States Environmental Protection Agency (EPA) has tasked the NUS Region 3 Field Investigation Team (FIT) to perform an expanded site inspection at the Valmont Site in Hazleton County, Pennsylvania. The inspection will be performed under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and the Superfund Amendments and Reauthorization Act of 1986 (SARA). The performance of this expanded site inspection is authorized under Technical Directive Document (TDD) no. F3-9012-26 issued under EPA Contract No. 68-01-7346.

1.1 Objectives of the Listing Site Inspection

An expanded site inspection is designed to characterize and evaluate the potential risks associated with a hazardous waste control problem at a site. The expanded site inspection builds upon the body of information collected during the preliminary assessment and screening site inspection. The purposes of collecting additional data are to characterize the site and its environs. Through this process, sufficient information is developed to support a management decision as to whether a site qualifies as a candidate for further consideration. The overall objective of the expanded site inspection, then, is to gather evidence in support of documenting the hazardous risks associated with the subject site and substantiating the recommendation rendered.

1.2 Site-Specific Objectives of the Investigation

Based on previous information gathered at the Valmont Site by the Pennsylvania Department of Environmental Resources (PA DER) and the EPA Technical Assistance Team (TAT) and work performed by International Exploration, Incorporated (INTEX), the major pathways of concern are groundwater and soil exposure. Information concerning the site is also provided in hydrogeological reports produced by Environmental Resource Management, of Exton, Pennsylvania, and Groundwater Technology, Incorporated, of Mountain Top, Pennsylvania, for Continental White Cap Incorporated, located west of the Chromatex facility (see appendices A and B).

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The purpose of this investigation is to determine the extent and source of groundwater contamination around the Chromatex Plant No. 2, to obtain documentable data that can be applied to waste/source characterization, and to investigate the soil exposure and surface water migration pathway. Additional site-specific hydrologic and geologic information must also be obtained to further characterize hydrogeological conditions within the study area.

The groundwater pathway is emphasized because it contributes most to the site's rating. Based on previous studies, trichloroethylene (TCE) is known to exist within a portion of the aquifer underlying the site. Residential home wells located northeast of the site have shown TCE contamination at levels up to 1,400 ug/l. Currently, up to 100 residents in the study are supplied by an alternative source of potable water from the Hazleton Water Authority (HWA) because their home wells have been rendered unpotable due to contamination by TCE. Additional groundwater and hydrogeological data must be obtained because groundwater sampling at the site has not occurred within the past three years and the current regional hydrogeological conditions of the site are in question. Specifically, interconnection must be shown between designated hydrogeological units in order to determine the potential groundwater targets in the study area.

Investigation into source/waste characterization at the site is necessary. Direct attribution of contamination from the site is expected; therefore, further investigation into waste characterization is necessary to validate waste types at the site.

The soil exposure pathway is also emphasized because further investigation of this pathway could significantly affect the evaluation of the site. This assumption is based on the number of potential targets located within a one-mile radius of the site and the unknown extent of soil contamination at the site. Additionally, although direct attribution of contamination to the site is expected, further soil investigation will assist in proving this factor.

Further investigation into the surface water pathway is not expected to significantly affect the overall assessment of the site. However, additional investigation into the surface water pathway is necessary to characterize the migration of contamination from the site and to assist in the study of hydrogeological conditions at the site.

Further study concerning the air migration pathway is not expected to have significant effects due to the limited number of targets in the study area.

The investigation is designed to gather more accurate data to determine the regional hydrogeological conditions and the extent of groundwater contamination in the vicinity of the site. Additionally, more extensive study concerning the soil exposure pathway is needed to fully examine the effects on potential targets. It should be noted that an important part of the investigation is to obtain conclusive evidence that the aquifer underlying the site can be shown to consist of one hydrogeological unit. Specifically, interconnection of all aquifers of concern must be documented or the overall evaluation of the site would be affected.

1.3 Scope of Work

The tasks that will be performed during the investigation are as follows:

- Monitoring wells will be installed.
- Selected existing monitoring wells will be redeveloped.
- Groundwater samples will be collected.
- A trace test will be performed.
- Surface water and sediment samples will be collected.
- Soil samples will be collected.
- Hydrogeological conditions will be studied.

1.4 Subcontractor Procurement

In the event that a subcontract(s) is required to complete the expanded site inspection, the Zone Project Management Office (ZPMO) in Washington, D.C. will assist in identifying qualified subcontractors to be used. Procurement planning will be under the direction of an NUS subcontracting specialist. The subcontracting specialist will be made aware of subcontracting needs by the FIT project manager.

Competitive bids will be solicited from qualified firms for each task to be subcontracted. Bids will be solicited from any local subcontractor meeting the qualification criteria. NUS will review the bids and select the subcontractor. The EPA contracting officer will review and approve the subcontractor selection prior to award of the subcontract. Subcontractor quality assurance and health and safety will be an NUS responsibility.

Depending on the type of subcontract agreement (fixed price, cost plus a fixed fee, etc.), NUS will establish a procedure for evaluating the performance of the subcontractor for continuing awards. NUS will coordinate such reviews with EPA and advise EPA when a subcontractor will be dropped. Subcontractors will be made aware of site-related health problems. Health and safety training of subcontractors will be provided by NUS.

PART II BACKGROUND INFORMATION

SECTION 2

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2.0 SITE DESCRIPTION

The information presented in this report about the subject site and its environs has been gathered from previous stages of the site investigation, from the work of other consultants, PA DER, and EPA, and from a FIT 3 site reconnaissance performed on January 15, 1991.

2.1 Site Location

Chromatex Plant No. 2 (Valmont Site) is located along Jaycee Drive in the Valmont Industrial Park in West Hazleton, Luzerne County, Pennsylvania (see figure 2.1, page 2-2). The site is located at 76° 00' 56" west longitude and 40° 58' 04" north latitude on the United States Geological Survey (U.S.G.S.) Conyngham, Pennsylvania quadrangle. The site can be located by measuring 2.13 inches west and 16.75 inches north of the southeastern corner of the quadrangle.

2.2 Site Layout

Chromatex Plant No. 2 (Valmont Site) is 6.92 acres in size. The site is part of the Valmont Industrial Park and is approximately 800 feet west of the borough of West Hazleton (see figure 2.2, page 2-3). Access to the site is unrestricted.

The site is bordered to the south by All Steel Equipment, Incorporated, which is approximately 500 feet from Chromatex Plant No. 2. An open field with a generally flat topography and sparse vegetation is between the southern side of Chromatex Plant No. 2 and All Steel Equipment, Incorporated. A drainage ditch runs through the field. The drainage ditch originates near the northern side of the All Steel, Incorporated plant and flows northwestwardly through the field toward Jaycee Drive. There is no apparent discharge point for the drainage ditch. Jaycee Drive parallels the site immediately to the east.

The Continental White Cap, Incorporated facility is located approximately 250 feet west of Chromatex Plant No. 2, across Jaycee Drive. There are currently 12 monitoring wells (MWs) on the Continental White Cap, Incorporated facility and around the facility perimeter.

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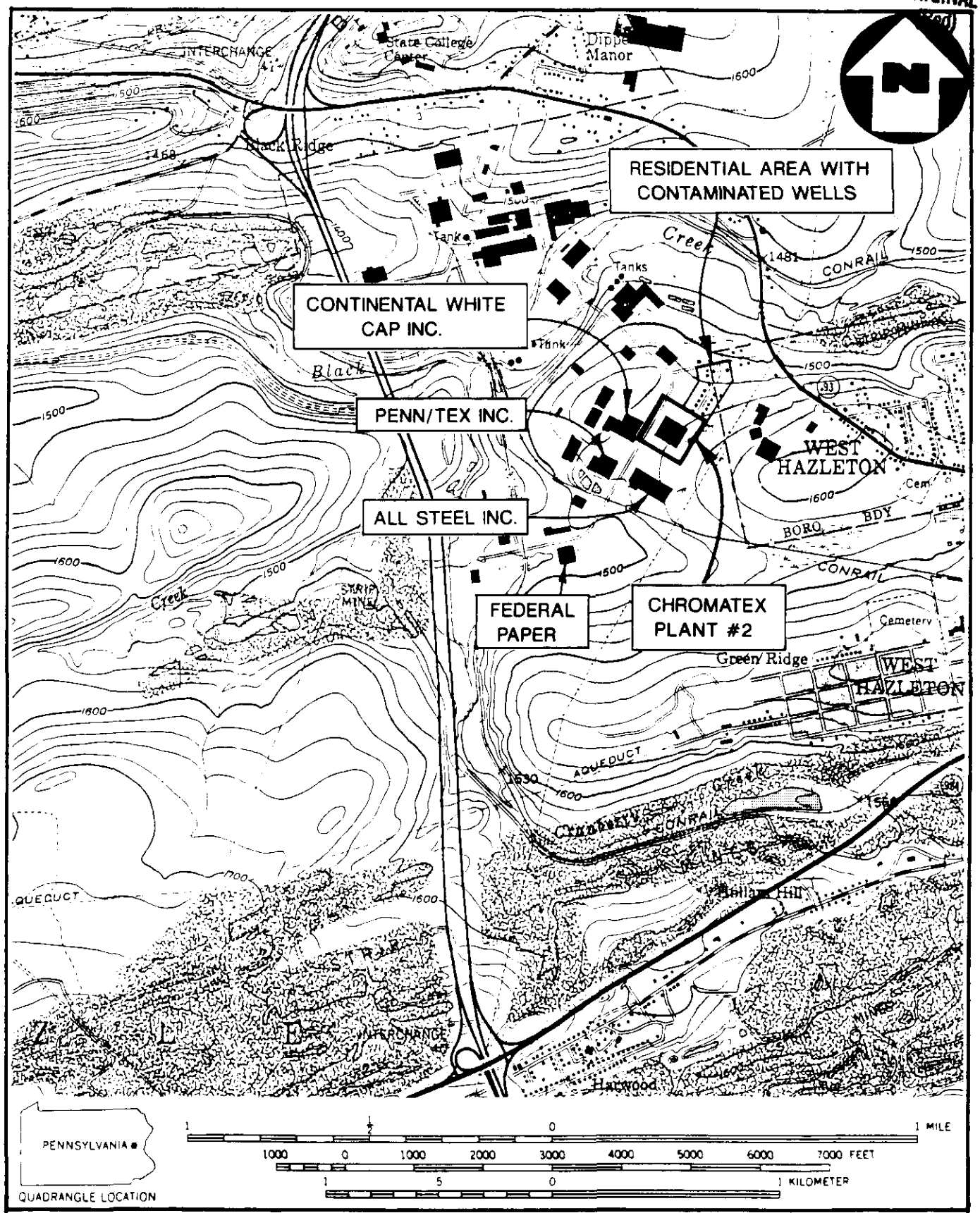

SOURCE: (7.5 MINUTE SERIES) U.S.G.S. CONYNGHAM, PA., QUAD.

SITE LOCATION MAP

FIGURE 2.1

VALMONT SITE (CHROMATEX PLANT #2), WEST HAZLETON, PA

SCALE 1: 24000

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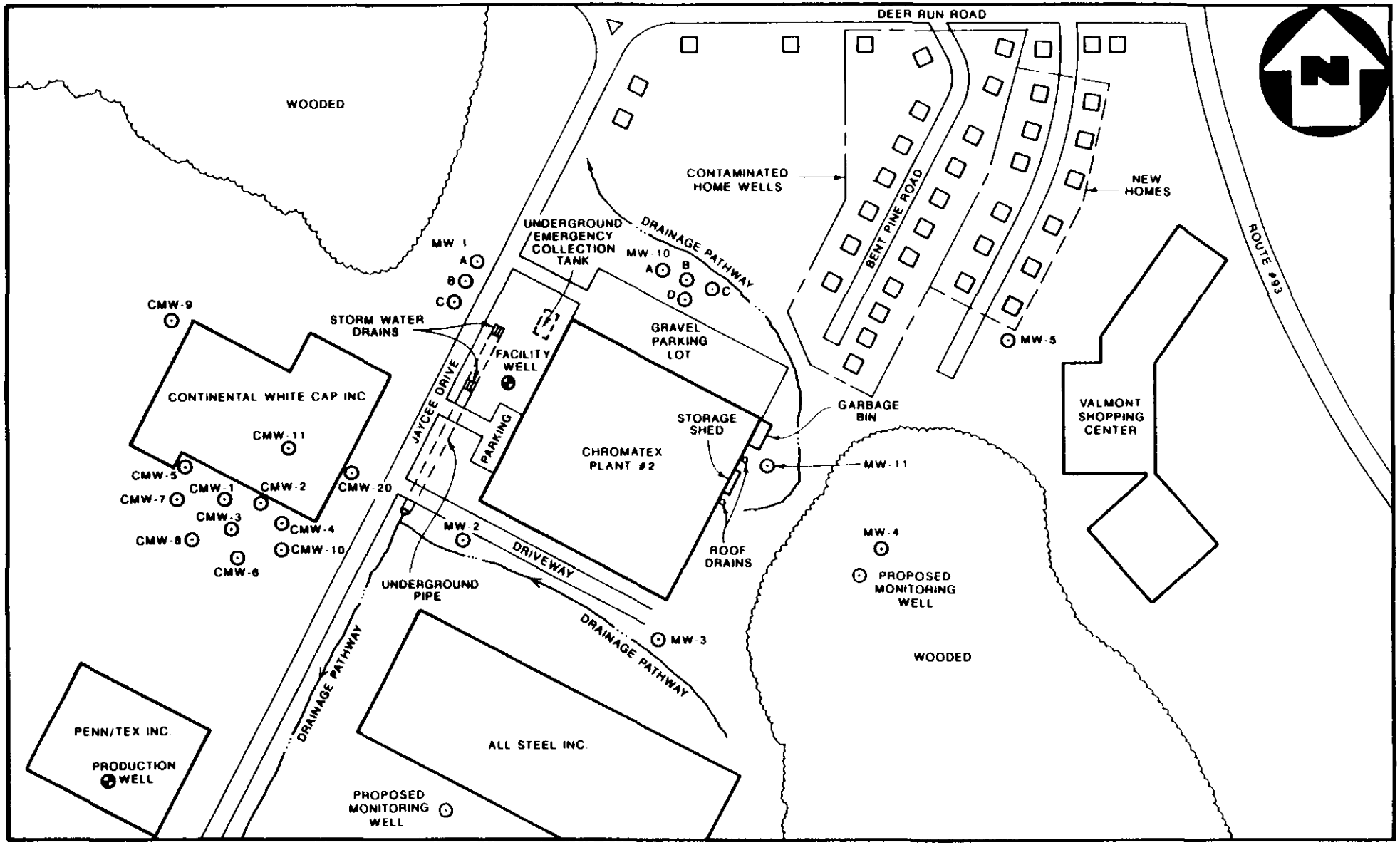

FIGURE 2.2

SITE SKETCH

VALMONT SITE (CHROMATEX PLANT #2) WEST HAZLETON, PA.

(NO SCALE)

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A residential area is located north of the site. This area includes many new homes that have been constructed since 1988. The residences whose home wells previously showed TCE contamination are also located north of the site, within the residential area. The nearest home to the site is located approximately 200 feet north-northeast of the site. The total number of homes in the residential area north of the site is estimated to between 50 and 100.

The area west of the site currently consist of woodlands. It should be noted that, at the time of the FIT 3 site reconnaissance of the site, on January 15, 1991, the woodlands west of the site were being cleared for the construction new homes.

The Valmont Shopping Plaza is located approximately 1,500 feet east of the site. The plaza consist of several stores and shops, none of which are known to generate or store hazardous waste. The Penn/Tex, Incorporated facility is located approximately 600 feet southwest of Chromatex Plant No. 2.

The site consists of one plant building and several satellite areas. The main plant building is approximately 62,000 square feet in size. The northern side of the building contains a truck loading area and a catchment basin, where chemicals that were spilled during pumping into storage tanks were collected. A gravel parking lot is adjacent to the northern side of the building. Underground fuel oil tanks are located approximately 150 feet northeast of the northern corner of the building. A monitoring well cluster (MW nos. 10 A, B, C, and D) is located 175 feet north of the northern side of the plant building. The drainage ditch is located approximately 200 feet north of the northern side of the plant. The drainage ditch originates along the eastern side of the plant building and flows northwardly for approximately 200 feet before curving to the west. The drainage ditch terminates west of the site near Jaycee Drive.

A storage shed, a garbage dumpster, and an empty drum storage area are located along the eastern outside wall of the facility. MW no. 11 is approximately 25 feet southeast of the northeastern corner of the building. Two roof-top drainpipes discharge along the eastern side of the building near the storage shed. These drainpipes collect all rainwater from the roof top. Water discharging from the pipes appears to collect along the eastern side of the building. Some of this water may enter the drainage ditch and flow northwestwardly following the drainage ditch. The area along the eastern side of the building may serve as a recharge point for the underlying aquifer. No drums were located in the drum storage area at the time of FIT 3 visit.

The southern side of the plant building contains a utility area. A paved driveway parallels the building. Two MWs (nos. 2 and 3) are located along the southern side of the building. MW no. 2 is located approximately 150 feet south of the southwestern corner, and MW no. 3 is located approximately 150 feet south of the southeastern corner of the building. The MWs are located in the field that separates Chromatex Plant No. 2 and the All Steel Equipment, Incorporated facility. The wells are on All Steel, Incorporated property.

The western side of the building consists of the facility entrance and a paved parking lot. Jaycee Drive parallels the western side of the building (approximately 100 feet west). A 10,000-gallon underground storage tank was formerly located at the northwestern corner of the building. This tank was used for the collection of spilled chemicals at the plant in the event of a spill or leak. The tank and its contents had been removed at the time of FIT 3 visit. The facility production well is located along the western side of the building, approximately 20 feet northwest of the plant entrance. Three MWs (nos. 1 A, B, and C) are located approximately 175 feet west of the plant entrance. These wells are located across Jaycee Drive on Continental White Cap, Incorporated property.

Two additional MWs are located at the site. MW no. 5 is located in the residential area approximately 300 feet northeast of the northeastern corner of the facility. MW no. 4 is located in the woodland area approximately 200 feet east of the facility.

The site is located in the saddle of a northwest-trending ridge. Although the site appears to be relatively flat in most areas, topography surrounding the site indicates that the site is part of a surface water divide. The divide runs approximately east to west through the site. The slope of the site on the northern portion of the site tends to the northeast, while the slope on the southern portion of the site tends toward the south.

At least two storm water collection basins are located at the site. The identified basins are located on the western side of the building. According to a Chromatex official, storm water collected in these basins is transported via piping to a drainage ditch located south of the site, along the eastern side of Jaycee Drive.

2.3 Land Use

The site is located in an industrial park. Industry borders the site to the north, west, and south. A small residential development is located immediately northeast of the site. Woodlots and a commercial development are located east of the site. The borough of West Hazleton and the city of Hazleton are located less than one mile east of the site.

2.4 Site History

The site was originally owned by CAN DO, Incorporated, a nonprofit development organization located in Hazleton, Pennsylvania. CAN DO, Incorporated constructed the building shell at the site in 1963.

Available information indicates that the building was vacant from the time of its construction in 1963 until 1965. In 1965, Wallace Metals Products purchased the site and began operation. There is no information regarding Wallace Metal Products' operation at the site, although it is known that the company manufactured coffins. Wallace Metal Products ceased operations at the site in 1972.

In 1972, Futura Fabrics, a division of Chelsea Industries, a manufacturer of knitting fabric and drapery material, purchased the property from Wallace Metal Products. Futura Fabrics operated two sites in the Valmont Industrial Park. At one property, Futura operated a dye facility. At the subject site, Futura operated a knitting facility. According to a representative of Futura Fabrics, it was asserted that no solvent-type materials were used at the facility. Futura Fabrics occupied the site until July 1978.

In July 1978, the site was purchased by the Valmont Group, of Paterson, New Jersey. The Valmont Group immediately leased the property to Chromatex, Incorporated. Several partners of the Valmont Group were stockholders in Chromatex, Incorporated until 1986, when the outstanding stock of Chromatex, Incorporated was sold to Rossville Industries, Incorporated, of Rossville, Georgia. The Valmont Group is still the current owner of the property; Chromatex, Incorporated is still the lessee.

Chromatex, Incorporated is an upholstery fabric manufacturer. Formerly, as part of a manufacturing process, Chromatex sprayed TCE on fabric as a transporter of Scotchguard (stain repellent). The facility used a solvent vapor recovery system inside the plant for the application of TCE onto the fabric. TCE was reclaimed using an activated carbon recovery system. Chromatex, Incorporated notified EPA of its RCRA hazardous waste generator status in August 1980. Chromatex, Incorporated is a RCRA-permitted facility under EPA I.D. No. PAD000779942. Spent carbon with traces of TCE was transported by B.E.S. Environmental Specialists to Environmental, Incorporated, in Sewickly, Pennsylvania, for processing and reactivation. TCE was stored on the site in two 5,000-gallon above-ground storage tanks inside the building. An underground 10,000-gallon tank was used to store TCE in case of spills and emergencies. The use of TCE and the carbon absorption unit was discontinued in mid-1988.

Attention was called to the site in October 1987 when Continental White Cap, Incorporated notified PA DER of a small spill of alcohols at its facility, located west of Chromatex Plant No. 2. Upon further investigation by PA DER and after complaints by residents, home wells northeast of Chromatex Plant No. 2 were sampled. Sample results from PA DER revealed TCE concentrations as high as 1,400 ppb in home wells. These results initiated further investigation by the EPA TAT in October 1987.

TAT performed a preliminary soil, gas, and groundwater investigation of the Chromatex property in October 1987. Soil gas results revealed two TCE plumes at the Chromatex facility. One plume located near the southwestern corner of the building revealed TCE in soil gas to levels up to 3.2 ppm. A much larger TCE plume was detected along the northern and eastern sides of the facility. TCE concentrations in this area ranged between 0.1 to 12.5 ppm. The highest concentrations were obtained along the eastern side of the building, near MW no. 11. In addition, headspace analysis was conducted on the underground emergency storage tank, and a level of 1,100 ppm TCE was revealed.

EPA emergency funding was required in December 1987 to install a public water line to the residential section immediately northeast of the site, as a result of the high levels of TCE discovered in home wells by PA DER.

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Based on the results of the investigations by PA DER and TAT, EPA and Chromatex agreed that a hydrogeological investigation was necessary to determine the extent of groundwater contamination at the site. INTEX was contracted by Chromatex to perform the hydrogeological investigation. As part of the INTEX study, 11 MWs were installed at the site. The study revealed that the major source of the groundwater contamination is located near MW no. 11, contamination did not originate from the underground storage tank, an apparent groundwater divide runs west to east through the site, and extensive TCE contamination is present in the aquifer underlying the site.

As of January 15, 1991, no remediation has been taken addressing the groundwater contamination at the site. A municipal water hookup has been provided to residents with EPA emergency funding. Several lawsuits have been brought against Chromatex by residents whose home wells have become contaminated. The outcome of these lawsuits is still pending as of January 1991.

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SECTION 3

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3.0 ENVIRONMENTAL SETTING

The geologic and hydrogeologic conditions in the study area were researched as a part of the site investigation. A preliminary literature review was conducted to determine surface and subsurface geologic conditions, soil character, and the status of groundwater transport and storage.

3.1 Geology

The Valmont Site is located in the Appalachian Mountain Section of the Valley and Ridge Physiographic Province. This section is underlain by broadly folded Paleozoic sedimentary rocks that range in age from Mississippian to Pennsylvanian. The topography is characterized by a northeast-southwest-trending succession of narrow, steep-sided ridges and valleys. The maximum relief within the area is approximately 800 feet.

The Mauch Chunk, Pottsville, and Llewellyn Formations crop out within three miles of the site (see *figure 3.1, page 3-2*).

The site is underlain by the Pennsylvanian age Pottsville Formation. The formation consists of a gray conglomerate, conglomeratic sandstone, siltstone, sandstone, and some anthracite coal. The Pottsville Formation's thickness ranges from about 275 to more than 800 feet. The jointing and the faulting in this formation are important. The joints are moderately well formed, moderately to highly distributed, widely to moderately spaced in sandstone and close in shale, open, and vertical. Subsidence fractures may be encountered in connection with underground clay and coal mining.

Underlying the Pottsville Formation is the Mississippian age Mauch Chunk Formation. The Mauch Chunk Formation is composed of an interbedded brownish-gray to grayish-red siltstone, claystone, and brownish-gray to pale red poorly cemented, fine-grained sandstone. The thickness ranges up to 1,200 feet. Joints are abundant, moderately well formed, regularly spaced at close to moderate distances depending on lithology, open, and vertical. The sedimentary rocks of this formation crop out 1.4 miles southeast and 1.7 miles northwest of the site.

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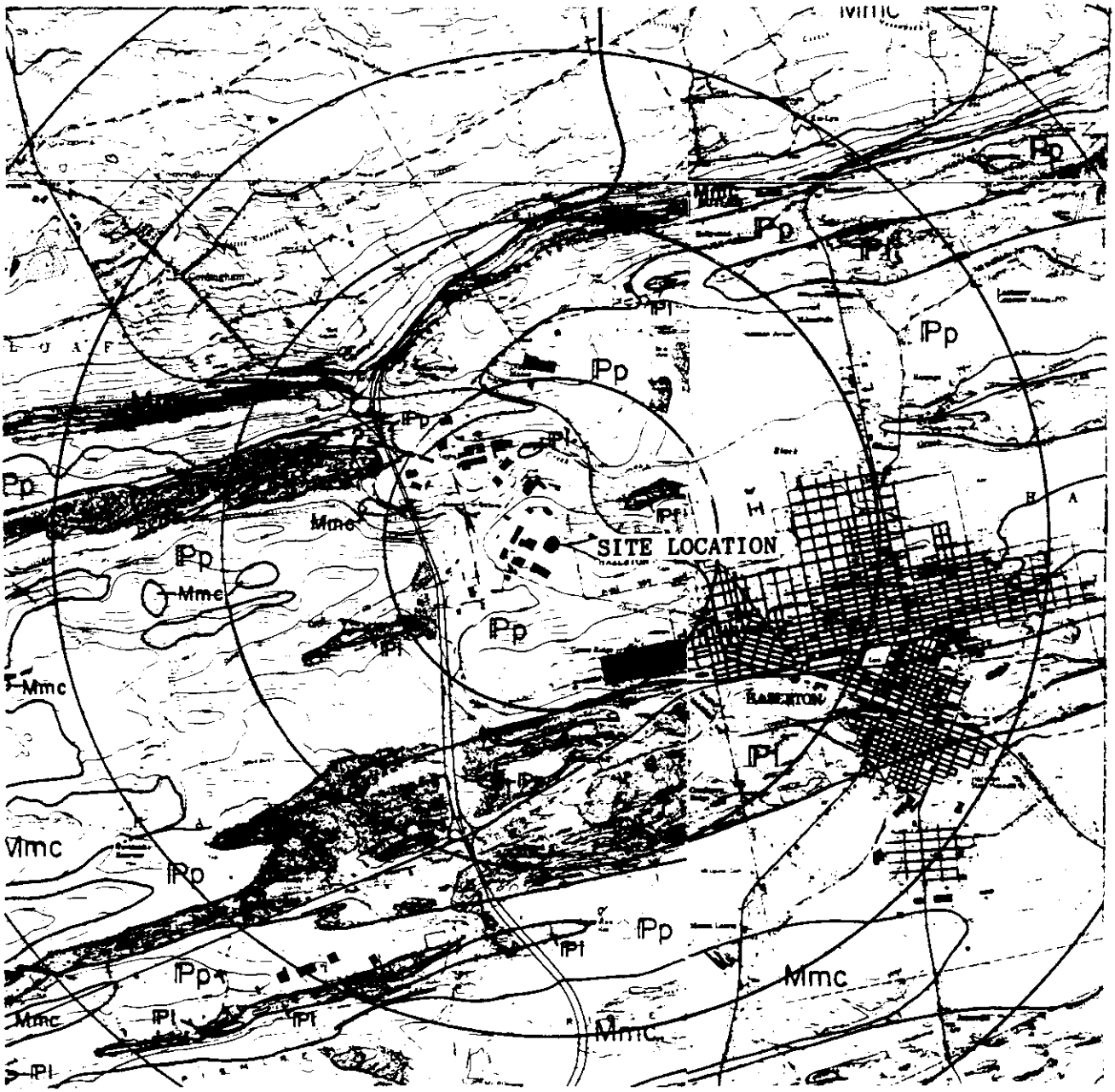
EXPLANATION

Pl - Llewellyn Formation;
Pp - Potsville Formation;
Mmc - Mauch Chunk Formation;



SOURCE: ATLAS OF PRELIMINARY GEOLOGIC QUADRANGLE MAPS OF PENNSYLVANIA

FIGURE 3-1

GEOLOGIC MAP

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Conyngham, Luzurn Co., PA.

Stratigraphically overlying the Pottsville Formation is the Pennsylvanian age Llewellyn Formation. The formation is composed of a gray, fine- to coarse-grained sandstone, siltstone, and some conglomerate and anthracite coal. The coal beds are the most persistent units within the formation; the intervening strata are characterized by extreme lateral changes in thickness and lithology. The Llewellyn Formation's thickness ranges from about 1,200 to 1,800 feet. The joints are moderately developed, moderately abundant, moderately spaced, open, and steeply dipping.

3.2 Soils

The Valmont Site is immediately underlain by Cut and fill land (CY), which covers 100 percent of the site (see figure 3.2, page 3-4).

Cut and fill land consists of a land that has been cut and areas of arable fill material. The soil has been disturbed or altered by earth-moving operations to the extent that all profile features are obliterated. All soil properties need on-site investigation.

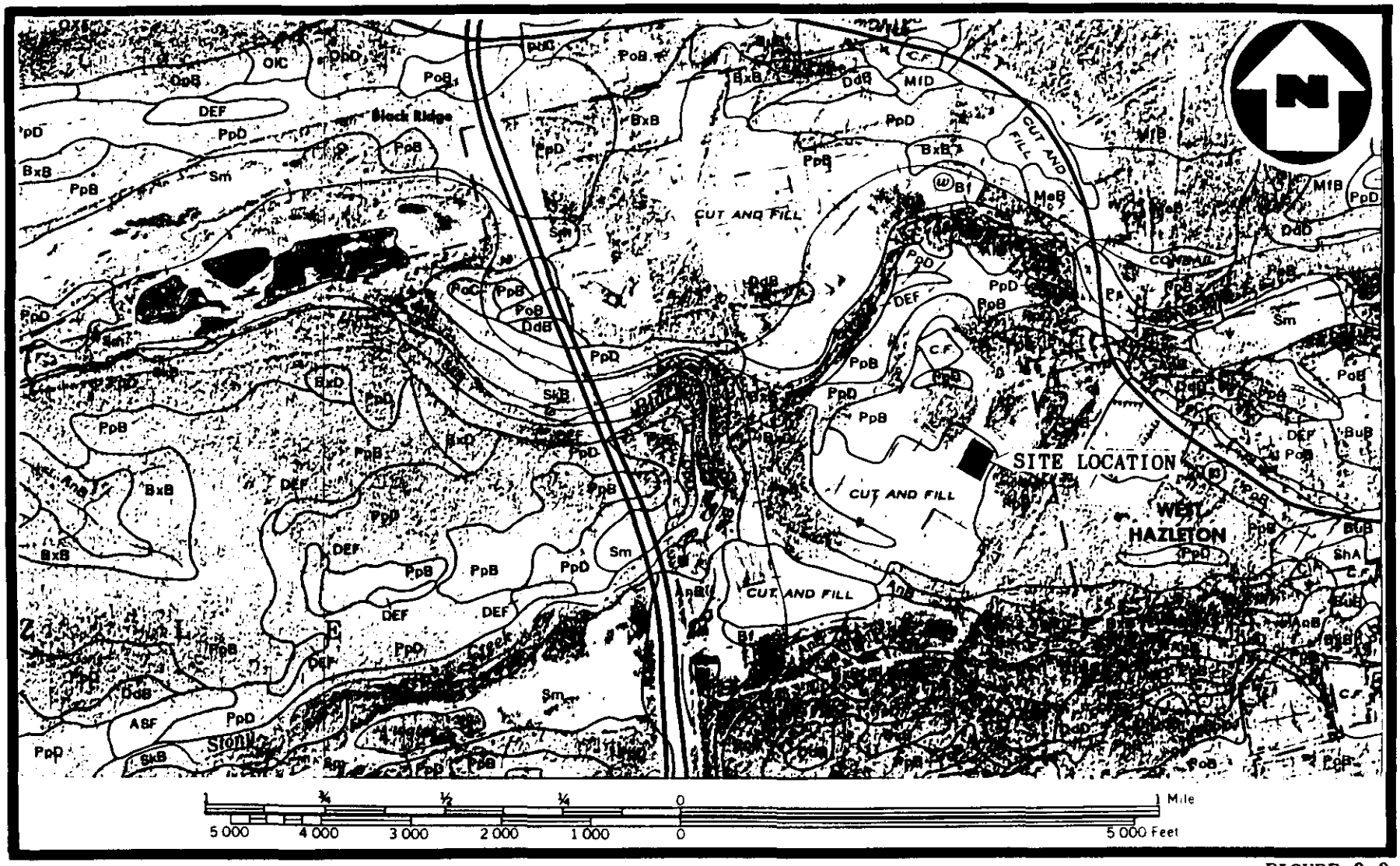
The building and parking lots cover approximately 25 percent of the site.

The area surrounding the site is covered by Pocono extremely stony sandy loam, three to eight percent slopes (PpB). The PpB is deep, well-drained, gently sloping to moderately steep soil. The top inch in a representative profile is an organic layer of partly decomposed leaf litter. The surface layer is about one inch of a very dark brown gravelly loam. The subsurface layer is pinkish-gray gravelly sandy loam about four inches thick. The subsoil to a depth of 65 inches is strong brown gravelly loam.

The soil permeability is moderate and ranges from two to six inches per hour. The soil reaction is strongly acid and ranges from 3.6 to 5.5. The runoff is slow, and the hazard of erosion is slight.

3.3 Hydrogeology

The area under investigation is underlain by the Mauch Chunk, Pottsville, and Llewellyn Formations and alluvium. The water-bearing characteristics of these units depend on their lithologic and structural features. All formations in this area are water bearing. The water moves through interconnected openings in the rocks that have occurred as a result of either primary (interstitial) or secondary (fractured) porosity. All formations within the study area are interconnected through the fractures, and they can be considered as a regional common hydrogeologic unit.



Source: United States Department of Agriculture, Soil Conservation Service. Soil Survey of Luzerne County, Pennsylvania. 1982.

FIGURE 3-2

SOILS MAP

VALMONT SITE
Conyngham, Luzurn Co., PA.

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The Pottsville Formation is an important water-bearing formation within the study area. It yields moderate to large supplies of good quality water. Many of the wells drilled in it are artesian. There are large fluctuations in groundwater levels between dry and wet periods. The well depths range from 22 to more than 1,900 feet. The well yields range from less than 5 to more than 150 gallons per minute (gpm). The median yield is 50 gpm. The groundwater is of good quality. It is very soft and contains relatively small amounts of dissolved solid.

The water-bearing characteristics of the Llewellyn Formation are greatly influenced by mining activity. Water in mine pools or in proximity to mining operations is usually of too poor quality for most uses. In unmined areas, the Llewellyn Formation yields sufficient quantities of groundwater for domestic and small industrial and public supplies. High levels of iron and manganese are a persistent problem. The yield from domestic wells ranges from 2 to 50 gpm, and the median is 10 gpm. The well depths range from 115 to 901 feet. The median depth is 315 feet.

The Mauch Chunk Formation is one of the better water-bearing formations within the study area. It supplies adequate amounts of water for domestic use from shallow wells. The wells range in depth from 20 to 1,557 feet, and the median depth is 203 feet. The well yields range from less than 5 gpm to more than 250 gpm. The groundwater is of good quality. It is soft and contains small amounts of dissolved mineral matter.

Based on on-site monitoring well information, the general direction of the shallow groundwater flow beneath the site is to the northwest, toward Black Creek and Stony Creek. The depths to the shallow groundwater beneath the site range from 19.5 to 8.0 feet.

3.4 Surface Waters

The topography of the site is relatively flat. The majority of surface drainage from the site appears to lead toward Black Creek, which is located approximately 1,250 feet north of the site. In addition, surface drainage is also believed to flow overland for approximately one mile before discharging into Cranberry Creek, south of the site. From this point, Cranberry Creek flows westwardly then northwestwardly before emptying into Black Creek. Black Creek is classified as a cold-water fishery for the maintenance and propagation of fish species that are indigenous to a cold-water habitat. Although there are approximately 100 acres of wetlands within the study area, no wetlands exceeding 5 acres in size are located within 3 downstream miles of the site.

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3.5 Water Supply

The study area is served by two public water supply companies and private water supply wells. The public supplies utilize surface water and groundwater as their sources.

HWA supplies surface water and groundwater to a population of approximately 40,000 people in Hazleton Borough, West Hazleton Borough, and Hazle and Sugarloaf Townships. The company utilizes 6 surface intakes and 12 wells located throughout the distribution area. Of these sources, 5 surface intakes and 11 wells lie within the 4-mile-radius study area. The Barnes Run and Harleigh intakes are located 2.65 miles southeast and 2.65 miles east-northeast of the site, respectively. The daily average withdrawals are 1,500,000 gallons per day (gpd) and 168,000 gpd, respectively. Barnes Run is pumped to the Humboldt Reservoir, located 3.1 miles southwest of the site. The Barnes Run Reservoir is located 3.3 miles south of the site and has an average daily withdrawal of 1,500,000 gpd. The Eber- Vale Reservoirs (east and west) are located 3.8 miles east of the site. Barnes Run well no.3, located 2.6 miles southwest of the site, is drilled to a depth of 516 feet and has an average yield of 473 gpm. Mount Pleasant well nos. 2, 5, and 6 are located between 2.65 and three miles south of the site. They are drilled to depths of 227, 402.5, and 425.5 feet and have yields of 240, 300, and 319 gpm, respectively. The Valmont east and west wells, more commonly known the as CAN DO wells, are located 0.81 and 0.97 mile north of the site, respectively. The Valmont east well is the nearest well to the site. Both wells, drilled to an approximate depth of 400 feet, are used for emergency purposes only and tap the Pottsville Formation and the Mauch Chunk Formation. The HWA water supply system is fully integrated.

The Conyngham Water Company (CWC) supplies groundwater to a population of about 2,400 people in Conyngham Borough. The company obtains the water from five wells located at the southwestern corner of the borough, approximately 2.25 miles northwest of the site. The wells range in depth from 230 to 400 feet and draw groundwater from the Mauch Chunk Formation. CWC also obtains water from a tunnel bored into Sugarloaf Mountain, approximately 1.7 miles northwest of the site.

The remainder of the population within the study area uses groundwater from private wells for its potable supply. The wells are probably completed in the formations cropping out within the study area. For 18 wells within Hazle Township, the average depth and yield are 141 feet and 16 gpm, respectively.

SECTION 4

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4.0 SITE RECONNAISSANCE

4.1 Site Visit Summary

On January 15, 1991, NUS FIT 3 personnel Keith Hambley, Randy Patarcity, and Velitchko Etropolski performed a site reconnaissance of the Valmont Site (Chromatex Plant No. 2), located in West Hazleton, Luzerne County, Pennsylvania. The FIT was accompanied by Shawn Gogola, production manager of Chromatex, Incorporated.

The site reconnaissance included a site walk, a visual inspection of the property, and examination of MWs at the site. An HNU photoionization unit and organic vapor analyzer (OVA) were carried by the FIT. Several readings above background were recorded during the site reconnaissance. Monitoring equipment readings of wells and water-level measurements are recorded below:

Monitoring Well	OVA Reading (ppm)	HNU Reading (ppm)	Water Level/Well Depth (feet)
1A	None	None	19.5/48.5
1B	16	10	30.5/82
1C	None	None	30.5/113
10A	3	None	18/51.5
10B	2.5	None	24/84
10C	N/A	4	25.5/132
10D	2	25	12.5/17.5
11	3	30	8/57
2	0	10	9.5/56
3	0	8	12/49
4	0	0	16/56.5
5	2	0	12.5/47
Production Well	350	110	43/N/A

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Site Observations

- The site consists of one building (Chromatex Plant No. 2) and approximately seven acres of land that surround the building.

- Jaycee Drive parallels the site to the west.

- A residential area is located north and northeast of the site. Between 50 and 100 homes are located in the residential area.

- The Continental White Cap, Incorporated facility is located southwest of the site, across Jaycee Drive. The Continental White Cap facility has between 9 and 15 wells located on its property.

- All Steel, Incorporated is located south of the site. A field is located between Chromatex Plant No. 2 and the All Steel, Incorporated facility. The field was sparsely vegetated.

- Penn/Tex Incorporated is located south-southwest of the site. Penn/Tex has a production well on its property.

- A wooded area is located east of the site. The wooded area is being developed for residential use.

- Eleven MWs are located on the site. MW nos. 10 A, B, C, and D are located north of Chromatex Plant No. 2. MW nos. 1 A, B, and C are located west of the plant. MW nos. 2 and 3 are located south of the building. MW nos. 4, 5, and 11 are located east of the site.

- A production well is located on the site, along the western side of the plant building near the plant entrance.

- The topography of the site is relatively flat. Two drainage ditches are located at the site. One originates along the eastern side of the building and flows northwestwardly toward Jaycee Drive. The second drainage ditch originates near All Steel, Incorporated and flows northwestwardly through the field toward Jaycee Drive.

- Two storm water drainage basins are located along the western wall of the facility.

- Two roof-top drainage pipes are located along the eastern wall of the facility near MW no. 11.

4.2 Special Studies

A hydrogeological investigation was performed at the site in 1987 by INTEX (see section 7.0).

ORIGINAL
(Red)

PART III SITE DATA REVIEW AND DATA COLLECTION

ORIGINAL
(Red)

SECTION 5

5.0 SOURCE/WASTE CHARACTERIZATION

5.1 Significance of Waste Types and Quantities

The documentation of waste types at the site is important to assess the potential hazards associated at the site and to expand and qualify the analytical data that were collected during previous investigations. Additional investigation at the site may (but is not expected to) reveal contaminants other than TCE, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene, and related compounds that were previously identified in groundwater samples taken from the site. Therefore, although further investigation into waste types is necessary to qualify and expand on previous collected data, no significant effects on waste types are expected.

Currently, three potential sources of contamination exist at the site; a 10,000-gallon underground storage tank, a storm water drain pipe, and contaminated soil. The source of contaminated soils at the site is unknown but is believed to be a broken underground pipe from the building to the underground storage tank or the solvent recovery system located on the roof of the Chromatex Plant; the system may have released TCE to site soils. A storm water drain pipe that runs parallel to Jaycee Drive in front of the Chromatex Plant may receive floor drain discharge through underground pipes and will therefore be investigated as a potential source.

Formerly, an underground storage tank was located approximately 10 feet west of the northwestern corner of Chromatex Plant No. 2. The tank was used as an emergency collection unit to collect any releases of TCE at Chromatex Plant No. 2 from leaks or spills at the site. At the time of its investigation in November/December 1987, PA DER ordered that the contents of the underground storage tank be removed so the tank could be tested to determine if it was the source of groundwater contamination. Samples of liquid collected from the tank during removal revealed TCE contamination up to 3,500 ppm. Farmar Tank Testing, of Williamsport, Pennsylvania, then conducted a pressure test on the tank to test for leaks. Results of the testing revealed that the 10,000-gallon underground storage tank had no leakage points.

As an additional part of the investigation to determine if the underground storage tank was a source of the TCE contamination, the piping that connected the building to the storage tank was inspected. During the excavation of the piping, a section of the piping was revealed to be broken. Chromatex officials claim that the piping was broken during the excavation of the pipe. The party responsible for the breakage of the piping was never determined. The broken portion of the piping is currently in the possession of EPA officials. Soil samples were collected along each fitting of the pipe leading from the building to the underground storage tank. Analyses indicated high concentrations of TCE and other synthetic inorganic contaminants at these points (see appendix C).

ORIGINAL (Red)

Although the results of the investigation by PA DER revealed substantial TCE contamination in the area of the underground storage tank, the hydrogeological investigation by INTEX (see section 7.0) showed that the major source of contamination at the site originated in the area of MW no. 11, along the eastern wall of the facility, not near the underground storage tank. This conclusion is based on calculated groundwater flow directions and the levels of contamination in MWs and home wells.

As previously stated, the apparent source of contamination is along the eastern side of the building near, MW no. 11. Previous investigations and visual inspection of this area concluded that there is not a significant, directly attributable waste source in this area. It is possible that, during the past operation of the TCE recovery system on the roof of the facility, a malfunctioning of the system caused a release of TCE onto the plant's roof and the subsequent release of TCE to site soils via the rainwater piping that discharges from the roof along the eastern wall of the plant. Due to several unknown factors concerning this assumption, further investigation is not warranted.

The possibility exist for floor drains from either the Chromatex building or the Continental White Cap building to tie into the storm water pipe through underground piping. This potential source of contamination will be evaluated during the investigation.

As a result of the problems in directly attributing contamination to a specific source at the site, it will be necessary for any pathway in which Level I contamination cannot be shown to use a default value for waste quantity. Due to the expected detection of Level I contamination in groundwater, a higher default value for waste quantity can be used in scoring the groundwater migration pathway. It should be noted that, although a specific waste source at the site is unavailable, documentation is available indicating that Chromatex Plant No. 2 is directly responsible for the groundwater contamination at the site and in the residential home wells (see appendix A).

5.2 Data Gaps

Soil sampling is necessary at the site for source/waste verification and waste type validation. Previous investigations at the site have not undertaken extensive soil sampling. Estimated TCE concentrations in site soils are based solely on a soil gas survey performed by TAT in October 1987 and on limited soil sampling by PA DER and INTEX. The soil sampling by PA DER and INTEX is limited to the northwestern corner of the building near the underground storage tank. Soil sampling will verify waste types throughout the entire 6.92 acres of the site.

(Red)

5.3 Data Collection Strategy

5.3.1 Non-Sampling Data Collection

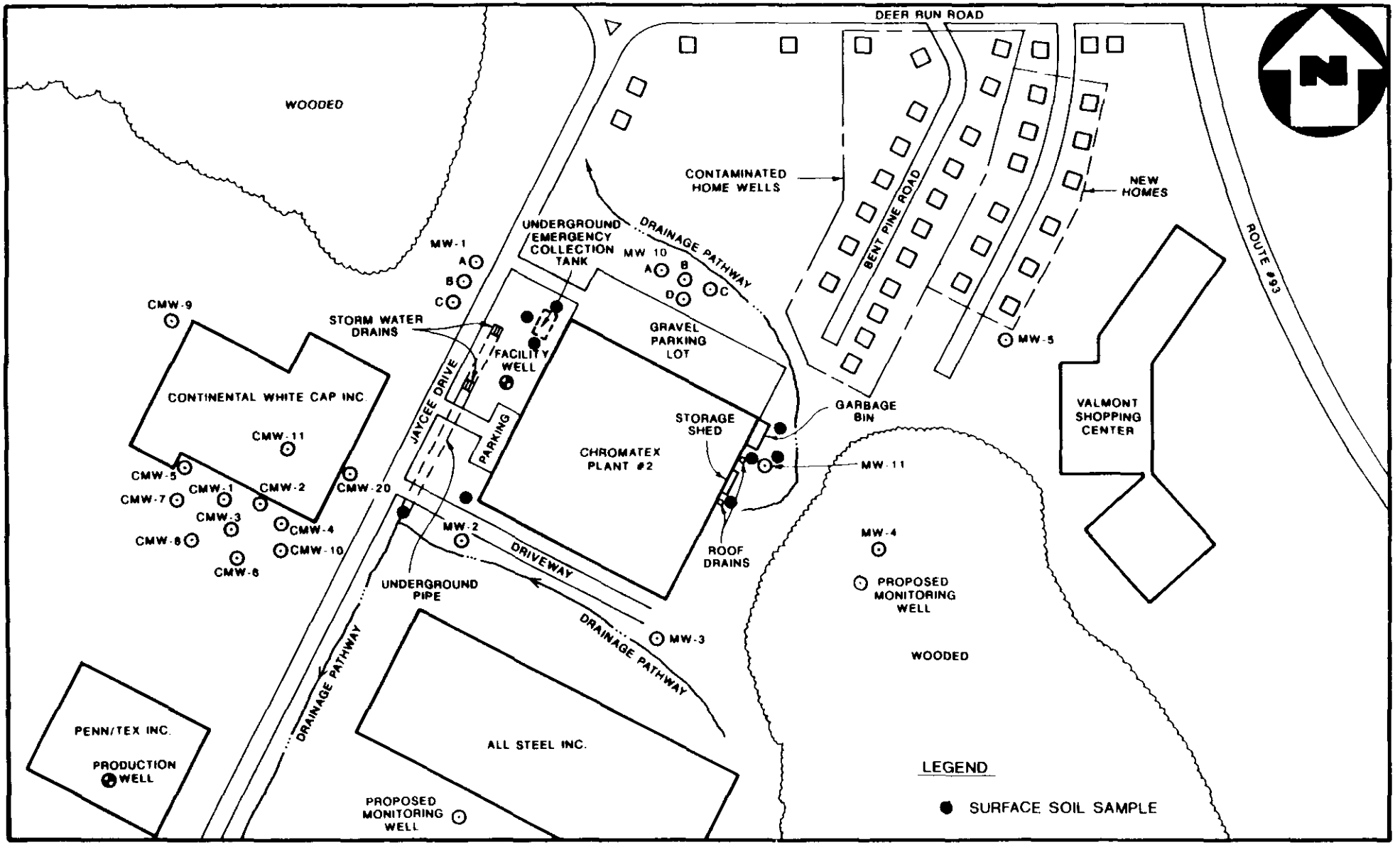
Non-sampling data collection for source/waste characterization will involve the inspection of the storm water drain pipe and an investigation of floor drain discharge points.

5.3.2 Sampling Data Collection

The proposed sampling for source/waste characterization will initially concentrate along the eastern side of Chromatex Plant No. 2 near MW no. 11.

The basis for initiating the investigation in this area is the soil gas survey performed by TAT. At the time of the TAT investigation, soil gas concentrations of TCE were up to 12.5 ppm in this area. The hydrogeological investigation by INTEX also revealed a large contaminant plume in this area. Therefore, it is expected that further investigation into this area will reveal significant levels of TCE and related compounds in soil samples. Preliminary soil sampling will consist of the collection of volatile organics compounds (VOCs) only. These initial samples will be screened by the field analytical support program (FASP) for VOCs (specifically TCE, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethene, and 1,2-dichloroethane). Based on the results of the initial screening of samples by FASP, any sample location showing significant levels of volatile organic contamination will be resampled for analysis by a Contract Laboratory Program (CLP) laboratory. The samples will be collected and analyzed for CLP target compounds (full-scan analysis). Although the target contaminants at the site are mainly VOCs, full-scan analysis will be conducted on all soil samples. These methods are warranted because full-scan analysis has not been performed on any samples collected at the site during previous investigations. Therefore, full-scan analysis by a CLP laboratory may identify any waste types at the site that were previously unknown.

The minimum number of initial soil samples to be collected is eight. Preliminary sample locations are indicated in figure 5.1 (page 5-4), and sample identifiers are listed in table 5.1 (page 5-5). The initial eight soil samples will be analyzed by FASP to established estimated concentrations of VOCs. As previously stated, any of the eight soil samples indicating significant levels of contamination will be resampled for CLP full-scan analysis. A sample of sediment from the storm water drain pipe will be collected and analyzed for CLP full-scan analysis. Additional soil samples may be collected based on the discretion of the project manager. Requirements and the necessity for additional samples are outlined below.



PROPOSED SOURCE/WASTE CHARACTERIZATION SAMPLE LOCATIONS

VALMONT SITE (CHROMATEX PLANT #2) WEST HAZLETON, PA.

(NO SCALE)

FIGURE 5.1

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Based on the screening of the initial eight soil samples by FASP, if elevated concentrations cannot be established in at least five of the eight samples, then additional sampling should occur at locations chosen by the project manager. Additional sampling should occur along the eastern wall of the Chromatex facility and/or near the underground storage tank near the northwestern corner of the plant building. Samples should be collected until analysis by FASP reveals that significant contamination is present in the soil in at least five soil samples.

Table 5.1

Sample Type	Sample No.	Location	Rationale	Analysis
Soil (grab)	S-1I	Eastern wall of Chromatex Plant No. 2, near the roof drain discharge (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-1	Eastern wall of Chromatex Plant No. 2, near the roof drain discharge (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-2I	Eastern wall of Chromatex Plant No. 2, near MW no. 11 (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-2	Eastern wall of Chromatex Plant No. 2 near MW no. 11 (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-3I	Eastern wall of Chromatex Plant No. 2 near the garbage bin (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-3	Eastern wall of Chromatex Plant No. 2 near the garbage bin (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-4I	Eastern wall of Chromatex Plant No. 2, approximately 30 feet east of the storage shed (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-4	Eastern wall of Chromatex Plant No. 2, approximately 30 feet east of the storage shed (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan

Table 5-1

Sample Type	Sample No.	Location	Rationale	Analysis
Soil (grab)	S-5I	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-5	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-6I	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-6	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-7I	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-7	Northeastern corner of Chromatex Plant No. 2 near the underground storage tank (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-8I	Southwestern corner of Chromatex Plant No. 2 (less than 2 feet deep)	Initial screening for detection of VOCs in soil	Organic (VOCs only) FASP
	S-8	Southwestern corner of Chromatex Plant No. 2 (less than 2 feet deep)	Source/waste characterization and delineation; on-site exposure availability	Organic and inorganic full scan
	S-9	Sediment from inside the storm water drain pipe	Source/waste characterization	Organic and inorganic full scan

All samples will be collected, decontaminated, packaged, and shipped according to standard protocol specified in the NUS FIT 3 Regional Operation Manual of Standard Operating Procedures and Standard Operating Guidelines. Specially, sampling and decontamination procedures will be performed according to SOG I, and packaging and shipping procedures will be performed according to SOP II.

SECTION 6

6.0 AIR PATHWAY

6.1 Significance of Pathway

Based on the information gathered to date, the air migration pathway is not considered a significant pathway of concern at the subject site. An observed release for this pathway would not significantly impact the overall rating of this site. Air monitoring using an HNU and/or an OVA will be conducted as part of the FIT safety protocol during the site investigation.

SECTION 7

7.0 GROUNDWATER MIGRATION PATHWAY

7.1 Significance of Pathway

Based on information collected during previous investigations at the site, the groundwater migration pathway is the pathway of most significance. Groundwater sampling that has taken place at the site has revealed the presence of TCE and its related compounds in several on-site MWs and in 23 residential home wells. The highest concentrations of TCE were 1,400 ug/l and 17,000 ug/l in a residential home well and MW no. 11, respectively.

Due to the elevated levels of TCE in the residential home wells northeast of the site, EPA emergency funding was provided to the residents for an alternative water supply source. In October 1987, all residents with elevated levels of TCE in their home wells were connected to HWA. No wells in the vicinity of the site are currently used for potable water. Most of the wells are still accessible if it is deemed necessary to investigate all residential home wells. Approximately 100 people were provided with alternative sources of potable water.

Further investigation concerning the groundwater pathway is necessary for three reasons. A comprehensive groundwater study of the area has not been performed at the site in more than three years. An essential part of the investigation is to determine the extent of migration of the contaminant plume beneath the site. Secondly, during previous investigations, the data obtained may not have been subject to quality assurance/quality control procedures. Sampling of groundwater at the site will assist in validating previous data. Most importantly, the aquifer underlying the site is believed to consist of more than one hydrogeological unit. Previous investigations at the site have yielded inconclusive evidence concerning the characteristics of this aquifer. Further investigation into aquifer characteristics so that, if it is determined that interconnection between hydrogeological unit exists, the overall significance of the groundwater pathway will increase significantly based on the number of potential targets.

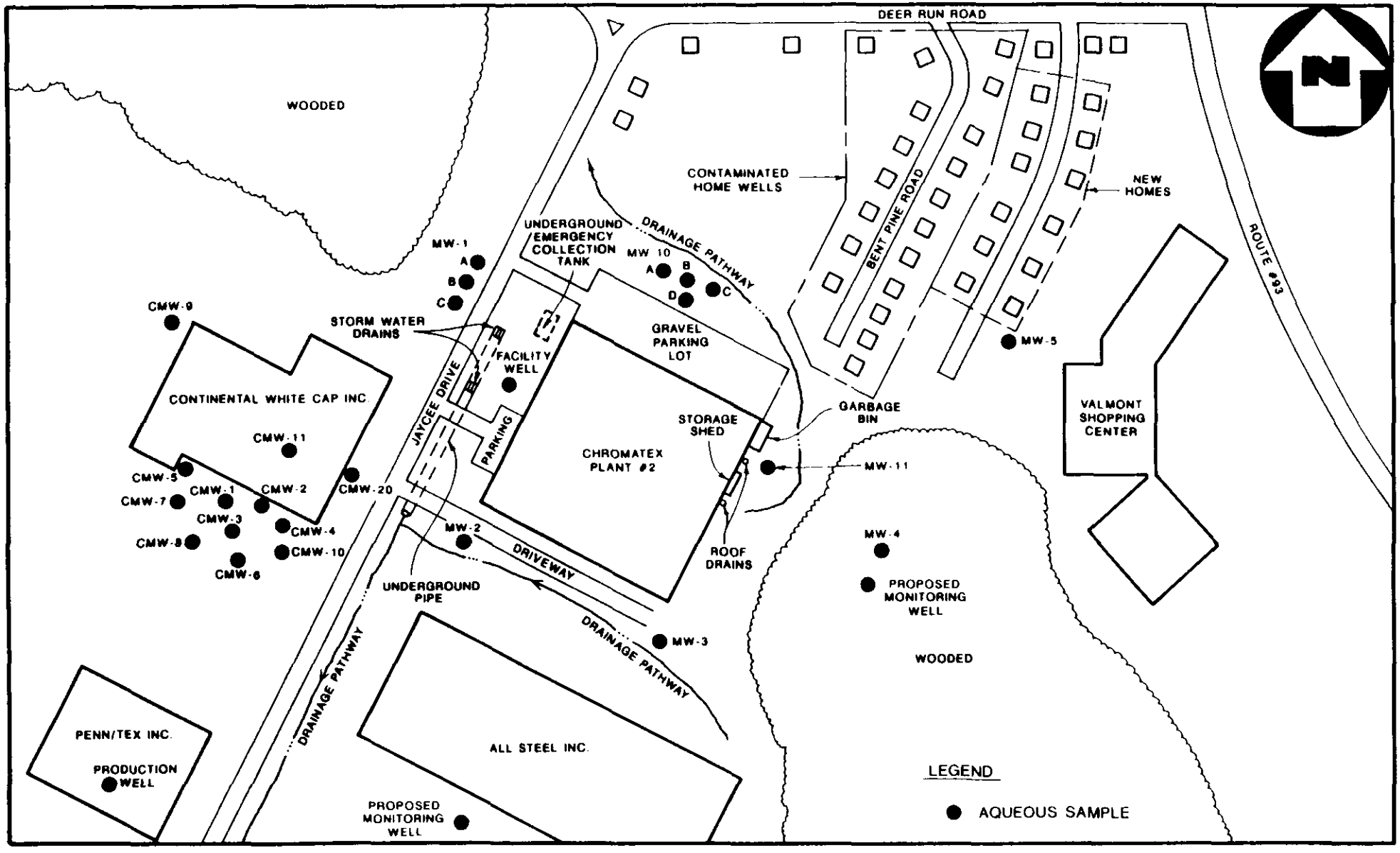
Potential targets consist of approximately 40,000 people who rely on groundwater obtained from the study area as their source of potable water as supplied by HWA and CWC. HWA and CWC currently obtain water from a combination of surface water intakes and wells. The wells are known to draw from the deepest portion of the hydrogeologic units in the study area. The MWs at Chromatex Plant No. 2 that indicated elevated levels of TCE and its related compounds tap the shallower hydrogeologic units. Therefore, it is necessary to show interconnection between all hydrogeologic units in order to include the potential targets in the groundwater pathway.

7.1.1 Existing Well Information

Twelve monitoring wells and 1 facility well are drilled at the site (see figure 7.1, page 7-3). Eight wells range from 15 to 55 feet in depth and are intended to monitor the upper 20 to 30 feet of the phreatic zone. Two wells are drilled to depths ranging from 80.5 to 82 feet and are intended to monitor the middle portion of the unconfined phreatic zone. Two wells are drilled to depths of 110 and 130 feet and are intended to monitor the first water-bearing zone encountered beneath an apparently unfractured and impermeable layer occurring at a depth of approximately 85 to 95 feet. The facility well is 400 feet in depth. The information available about well construction and the static water levels is as follows:

Table 7.1

Well No.	Total Depth (feet)	Depth of Inner Casing (feet)	Depth of Interval Monitored (feet)	Static Water Level Measured May 12, 1988 (feet)	Static Water Level Measured January 1991 (feet)	Approximate Yield of Monitored Interval (gpm)
1A	50.0	22.0	22 to 55	16.57	19.5	3.8
1B	80.5	55.0	55 to 80.5	24.75	30.5	<1.0
1C	110.0	86.5	86.5 to 110	24.94	30.5	1.3
2	55.5	15.0	15 to 55.5	7.21	9.5	2.33
3	47.0	18.0	18 to 47	15.66	12.0	1.0
4	55.0	15.5	15.5 to 55	11.81	16.0	3.75
5	45.0	15.0	15 to 45	8.00	12.5	1.1
10A	50.0	17.0	17 to 50	14.53	18.5	2.5
10B	82.0	57.0	57 to 82	18.96	24.0	<1.0



FIGURE

PROPOSED GROUNDWATER SAMPLE LOCATIONS

VALMONT SITE (CHROMATEX PLANT #2) WEST HAZLETON, PA.

(NO SCALE)

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Table 7.1 (continued)

Well No.	Total Depth	Depth of Inner Casing (feet)	Depth of Interval Monitored (feet)	Static Water Level Measured June 12, 1991 (feet)	Static Water Level Measured January 1991 (feet)	Approximate Yield of Monitored Interval (gpm)
10C	130.0	87.0	87 to 130	20.17	25.5	1.5
10D	15.0	15.0	13 to 15	11.54	12.5	<1.0
11	55.0	20.0	20 to 55	6.33	8.0	2.0
PW1	400.0	20.0	20 to 400	----	43.0	34.0

The monitored intervals in all wells, except 10D, are completed as open, unscreened boreholes, owing to the competency of the bedrock. The monitored interval in well 10D is completed using torch-slotted four-inch-diameter steel casing; its outer annulus is packed with pea-size quartz gravel. The wells were developed using an air-lift method.

In general, the rock types beneath the site encountered during the drilling are described as the Pottsville Formation and consist mostly of fine-, medium-, and coarse-grained, quartz-rich and arkosic sandstone. The sandstones are rich in dark minerals believed to be amphibole. Many of the sandstone beds are jointed, as evidenced by the many weathered fracture facies that were observed in the drill cuttings. A thin coal-bearing bed is encountered at three well sites, nos.1, 4, and 10. The bed occurs between 40 and 44.5 feet below the surface and is considered to be the same bed.

Twelve off-site monitoring wells are located from approximately 200 to 600 feet west of the site and south of Continental White Cap (see figure 7.1, page 7-3). There is no information available about the well construction and lithology. Water levels in on-site and off-site monitoring wells, measured on August 2, 1989, are as follows:

Table 7.2

On-Site Monitoring Wells (Chromatex Plant No. 2)	Total Depth (feet)	Depth of Inner Casing (feet)	Depth of Interval Monitored (feet)
1A	1,547.34	28.27	1,519.07
1B	1,547.91	35.41	1,512.50
1C	1,547.88	35.51	1,512.37
2	1,536.07	11.56	1,524.51
3	1,536.33	23.10	1,513.23
4	1,552.60	16.90	1,535.70
5	1,538.77	14.01	1,524.76
10A	1,537.39	21.95	1,515.44
10B	1,538.16	27.94	1,510.22
10C	1,539.00	29.27	1,509.73
10D	1,538.33	dry	----
11	1,539.73	10.10	1,529.63

Table 7.3

Off-Site Monitoring Wells (Continental White Cap)	Top of Casing Elevation (feet)	Depth to Water (feet)	Groundwater Surface Elevation (feet)
1	1,537.07	19.81	1,517.26
2	1,537.34	19.81	1,517.53
3	1,536.18	12.13	1,524.05
4	1,537.29	11.40	1,525.89
5	1,534.33	16.51	1,517.82
6	1,531.66	20.61	1,511.05
7	1,533.59	15.27	1,518.32
8	1,533.55	16.88	1,516.67
9	1,535.77	25.60	1,510.17
10	1,534.95	16.63	1,518.32
11	1,539.04	----	----
20	1,538.47	19.77	1,518.70

7.2 Data Gaps

The existing groundwater data for the subject site are deficient, and additional hydrogeological investigation will be provided to determine the following:

- the number of hydrogeological units underlying the site and study area and whether there is an interconnection between them.
- the groundwater flow direction in each hydrogeologic unit or the general groundwater flow direction in the weathered and fractured rock.
- the distribution of the groundwater contamination; public water supply sources.

The missing data are as follows:

- aquifer identification:

  - aquifer parameters, such as hydraulic conductivity, storage coefficient, porosity.

  - aquifer interconnections/discontinuities.

  - recharge and discharge zones for each hydrogeologic unit; zones with high permeability such as faults and major fractures.

  - well logs and water levels for off-site monitoring wells.

  - static water level and casing elevations of the home wells.

  - source identification (type, location, and level of contamination).

  - locations of the public water supply sources and formations from which they withdraw.

If some of the water supply wells are completed in a different formation than what is exposed at the site, the formation interconnection must be investigated.

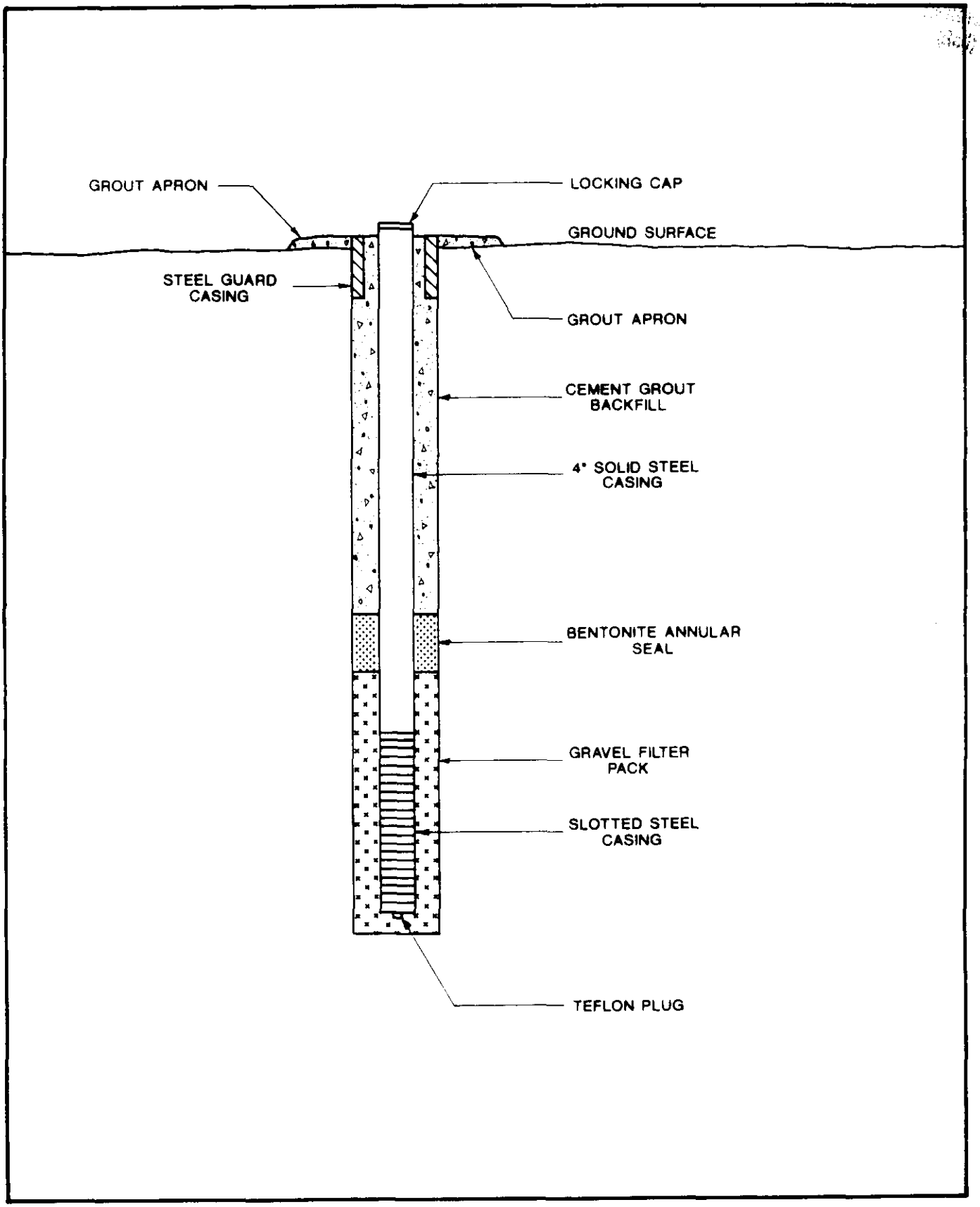
Recent water supply information has been requested from HWA.

7.3 Data Collection Strategy

7.3.1 Special Studies

Two MWs are proposed to complete the hydrogeological information about water levels, groundwater flow direction, and groundwater contamination. The first MW will be located approximately 1,000 feet west of the site and will be completed as a downgradient shallow monitoring well. The purpose of this well is to provide information about the water level and the level of contamination in the shallowest aquifer in order to determine the groundwater divide at the site and the hydraulic gradient south of the site and to give updated information about the size of the contaminated plume. The other well will be drilled upgradient, approximately 500 feet east of the site, and will be completed as a deep monitoring well. It will provide a background sample of the groundwater and information about groundwater levels in the deeper part of the aquifer.

The two proposed wells will be drilled using air-rotary techniques by a rig that has the capability to drive casing. Steel protective casing with a locking cap should be set a minimum of one foot into competent bedrock. A bentonite annular seal will be emplaced around the base of the casing from the drive or guide shoe upward. The remainder of the casing will be set in place using a cement/bentonite grout. The shallow MW should be drilled to 10 feet below the first encountered water-bearing zone. Its monitored interval will be completed using a continuous-slotted four-inch-diameter steel casing with its other annulus packed with pea-size quartz gravel. The monitoring interval shield can be completed with a four-inch polyvinyl chloride (PVC) slotted screen with a gravel pack around the screening interval. The locations and construction diagrams of the proposed MWs are provided on figures 7.1, 7.2, and 7.3 (pages 7-3, 7-8, and 7-9). The locations are general and are subject to change depending on conditions at the site.



SHALLOW MONITORING WELL CONSTRUCTION
VALMONT SITE (CHROMATEX PLANT #2), WEST HAZLETON, PA
(NO SCALE)

FIGURE 7-2

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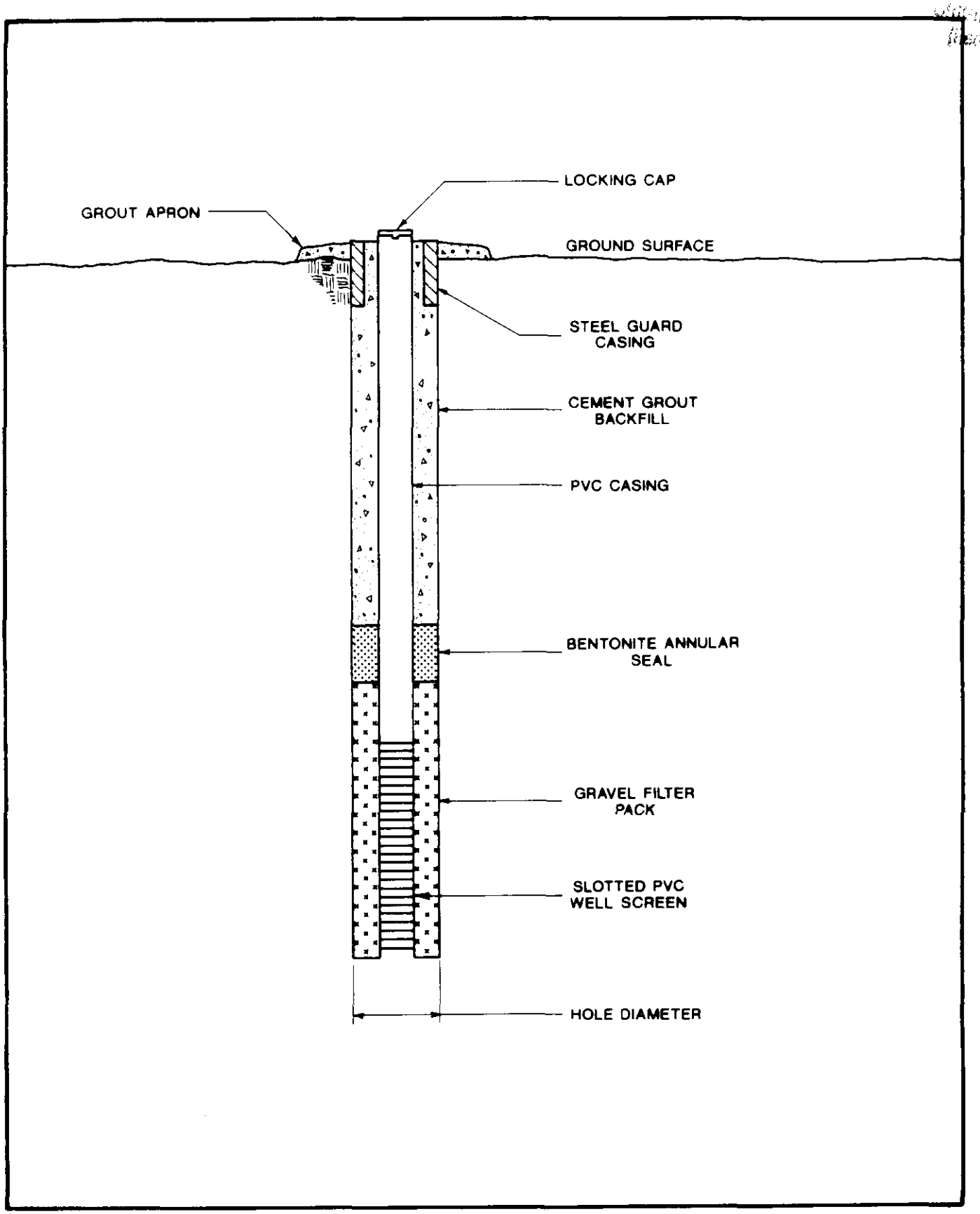


DEEP MONITORING WELL CONSTRUCTION

VALMONT SITE (CHROMATEX PLANT #2), WEST HAZLETON, PA

(NO SCALE)

FIGURE 7-3

NUS CORPORATION

AR100763

7.3.2 Non-Sampling Data Collection

Site-specific hydrogeological information about aquifer interconnection, transmissivity, and hydraulic conductivity will be obtained during a pumping and a tracing test from on-site MW group 10. The pumping and the tracing tests will be completed at the same time. During the pumping from the deepest well, 10C, the trace will be placed into the most shallow well, 10D. The drawdown data and recovery data from on-site MWs nos. 10A, 10B, 10D, 1C, 1B, and 11 and from the one off-site home well will be used to obtain information about aquifer interconnection and transmissivity. All wells used for groundwater level observation, except M group 10, should be equipped with continuous water-level recorders.

Groundwater trace samples will be obtained from MW nos. 10A, 10B, and 10C in order to prove an interconnection between the different hydrogeological units.

All on-site and off-site monitoring wells, at least five of the home wells, and the two proposed monitoring wells will be used for groundwater-level information in order to determine the groundwater surface and the groundwater flow direction.

All wells used for pumping and tracing tests and groundwater-level observation must be developed before the test. If some of the water supply wells are completed in a different formation than what is exposed at the site, the formation interconnection will be investigated.

7.3.3 Sampling Data Collection

Groundwater sampling for the Valmont site will include sampling from 33 wells:

-12 on-site MWs and 1 facility well

-2 proposed on-site MWs

-12 off-site MWs and 1 production well around Continental White Cap

-5 home wells

Before sampling, the wells will be purged until approximately three volumes of water have been removed. The aqueous samples from the wells will be collected in a stainless-steel bottom-loading bailer and then distributed into the sample jars. The samples will be analyzed for CLP target compounds. In addition, an extra sample will be obtained from each well, filtered, and analyzed for dissolved metals (see table 7.4, below).

TABLE 7.4
Groundwater Pathway
Data Collection Table

Sample Type	Sample No.	Location	Rationale	Analysis
Groundwater	MW 1A	west of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 1B	175 feet west of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 1C	175 feet west of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 2	150 feet southwest of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 3	150 feet south of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 4	200 feet east of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 5	300 feet northeast of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals

Sample Type	Sample No.	Location	Rationale	Analysis
Groundwater	MW 10A	175 feet north of Chromatex	Identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 10B	175 feet north of Chromatex	Identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 10C	175 feet north of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 10D	175 feet west of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	MW 11	25 feet east of Chromatex	identify aquifer parameters, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	FW	20 feet west of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	PMW 1	west of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	PMW 2	west of Chromatex	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 1	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 2	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals

Sample Type	Sample No.	Location	Rationale	Analysis
Groundwater	CMW 3	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 4	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 5	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 6	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 7	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 8	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 9	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 10	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 11	on Continental White Cap property	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	CMW 20	on Continental White Cap property	identify aquifer parameters and interconnection, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	PW	at Penn/Tex plant	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals

Sample Type	Sample No	Location	Rationale	Analysis
Groundwater	HW 2	northeast of site	identify aquifer parameters and interconnection, groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	HW 3	northeast of site	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	HW 3	northeast of site	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	HW 4	northeast of site	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals
	HW 5	northeast of site	groundwater level, quality control	CLP organic and inorganic full scan dissolved metals

FW - facility well
MW - on-site monitoring well
PMW - proposed monitoring well
MW1 - off-site monitoring well
PW - production well
HW - home well

The choice of the home wells for sampling will be made at a later date.

All samples will be collected, decontaminated, packaged, and shipped according to standard protocol specified in the NUS FIT 3 Regional Operations Manual of Standard Operating Procedures and Standard Operating Guidelines. Specifically, sampling and decontamination procedures will be performed according to SOG I, and packaging and shipping procedures will be performed according to SOP II.

SECTION 8

8.0 SURFACE WATER PATHWAY

8.1 Significance of Pathway

Based on information gathered to date during previous investigations at the site, the surface water pathway is not a significant pathway of concern. This assumption is based on the limited number of targets downstream of the site. Targets downstream consist of a small fishery and a limited amount of wetlands. Surface water runoff from the site may flow in one of two possible directions. The majority of the surface water from the site enters the drainage ditch located north and east of Chromatex Plant No. 2. Water entering this ditch flows northwestwardly toward Jaycee Drive. Upon nearing Jaycee Drive, the drainage ditch pathway becomes less apparent. At this point, the direction of surface water flow is uncertain, but it is assumed to be toward Black Creek. A portion of the surface water from the site is collected by storm water drains located along the western side of Chromatex Plant No. 2. Surface water entering the storm drains flows southwestwardly via underground piping to a drainage ditch along the eastern border of Jaycee Drive. Upon entering the drainage ditch, water flows southwardly to Cranberry Creek, which in turn flows to Black Creek. Additional surface water from the site may enter the drainage ditch via overland flow and then discharge to Cranberry Creek. Although the surface water pathway is not of significant concern, additional investigation is warranted. The investigation is necessary to characterize the migration of contaminants from the site, because no previous investigation into the surface water pathway has occurred at the site. Investigation into the surface water pathway may also assist in understanding the hydrogeological conditions in the study area.

8.2 Data Gaps

Surface water and sediment samples need to be obtained from select locations throughout the study area. These data will assist in determining if contamination originating from the site has migrated to surface water pathways within the study area.

Stream flows for Cranberry Creek and Black Creek will be obtained. These data will provide information regarding the dilution factors for these streams.

8.3 Data Collection Strategy

8.3.1 Non-Sampling Data Collection

Stream flow data will be collected from existing sources or field measurements taken during the investigation.

8.3.2 Sampling Data Collection

Sediment samples will be collected from the drainage ditch located north and east of Chromatex Plant No. 2, at three locations: near MW no. 11, near MW cluster no. 10, and adjacent to Jaycee Drive (see figure 8.1, page 8-3).

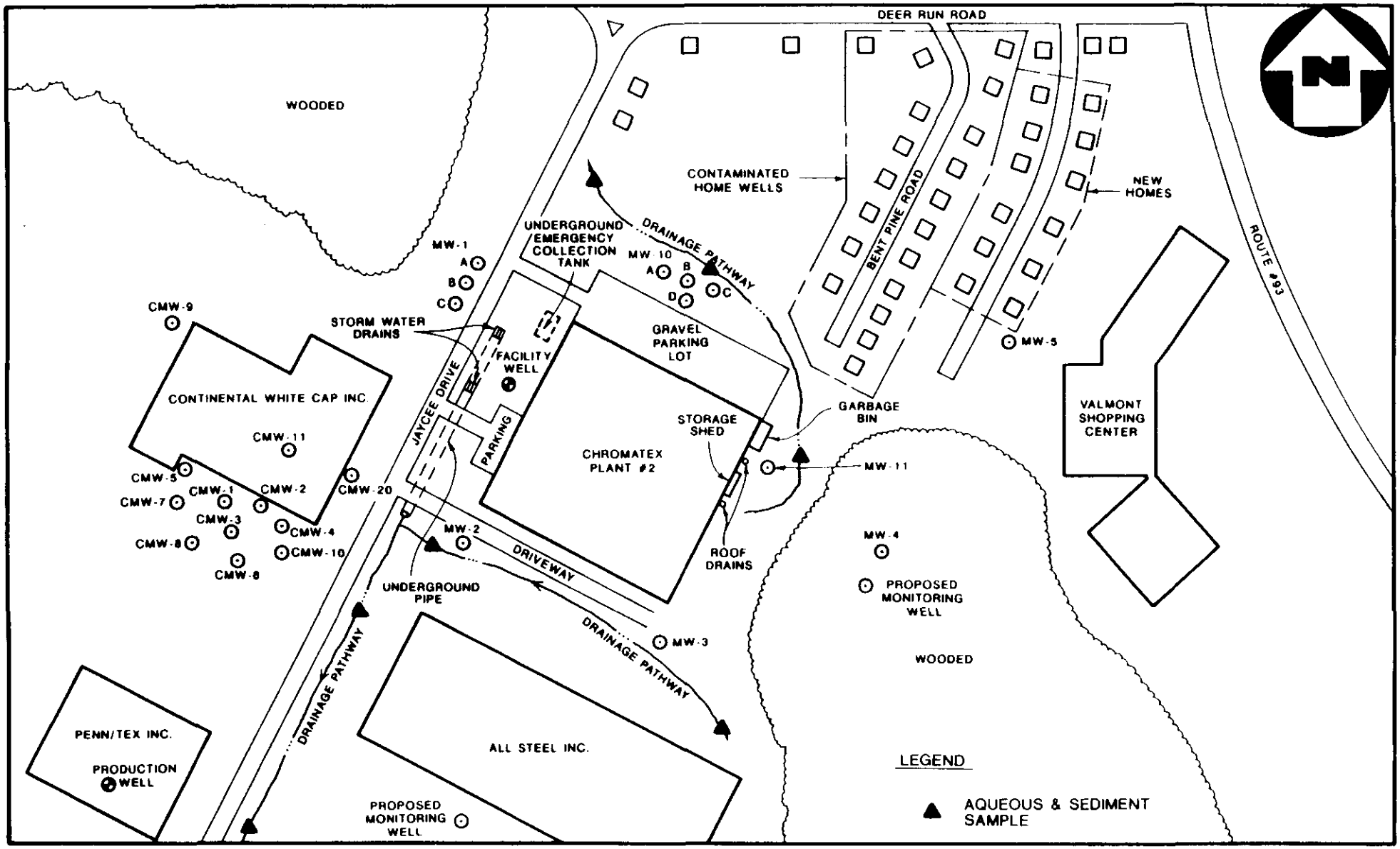
Sediment samples will be collected from the drainage ditch between Chromatex Plant No. 2 and All Steel, Incorporated, at two locations: near the northwestern corner of the All Steel, Incorporated plant and near Jaycee Drive (see figure 8.1, page 8-3).

Sediment samples will be collected from the drainage ditch that parallels the eastern edge of Jaycee Drive, south of Chromatex Plant no. 2. Three locations will be sampled: 50 yards south of the Chromatex property line, 150 yards south of the Chromatex property line, and 250 yards south of the Chromatex property line. These samples will assist in verifying that no other industries within the Valmont industrial park are a source of contamination (see figure 8.2, page 8-4).

A sediment sample will be collected from the unnamed intermittent stream approximately 0.35 mile south of the site, near the Federal Paper plant. This stream is suspected to be a groundwater discharge point and will be sampled to determine if groundwater to surface water migration is occurring at the site. At the time of the investigation, it will be determined if there is an upstream sample location. If an upstream location is discovered, then an additional sediment sample will be collected from the stream (see figure 8.2, page 8-3).

Aqueous and sediment samples will be collected from Cranberry Creek at two locations: upstream and downstream (see figure 8.2, page 8-4).

All samples will be analyzed for CLP target compounds. Additionally, pH and conductivity of all samples will be recorded at the time of sampling (see table 8.1, page 8-5).



8-3

PROPOSED SURFACE WATER SAMPLE LOCATIONS
VALMONT SITE (CHROMATEX PLANT #2) WEST HAZLETON, PA.

(NO SCALE)

FIGURE 8.1

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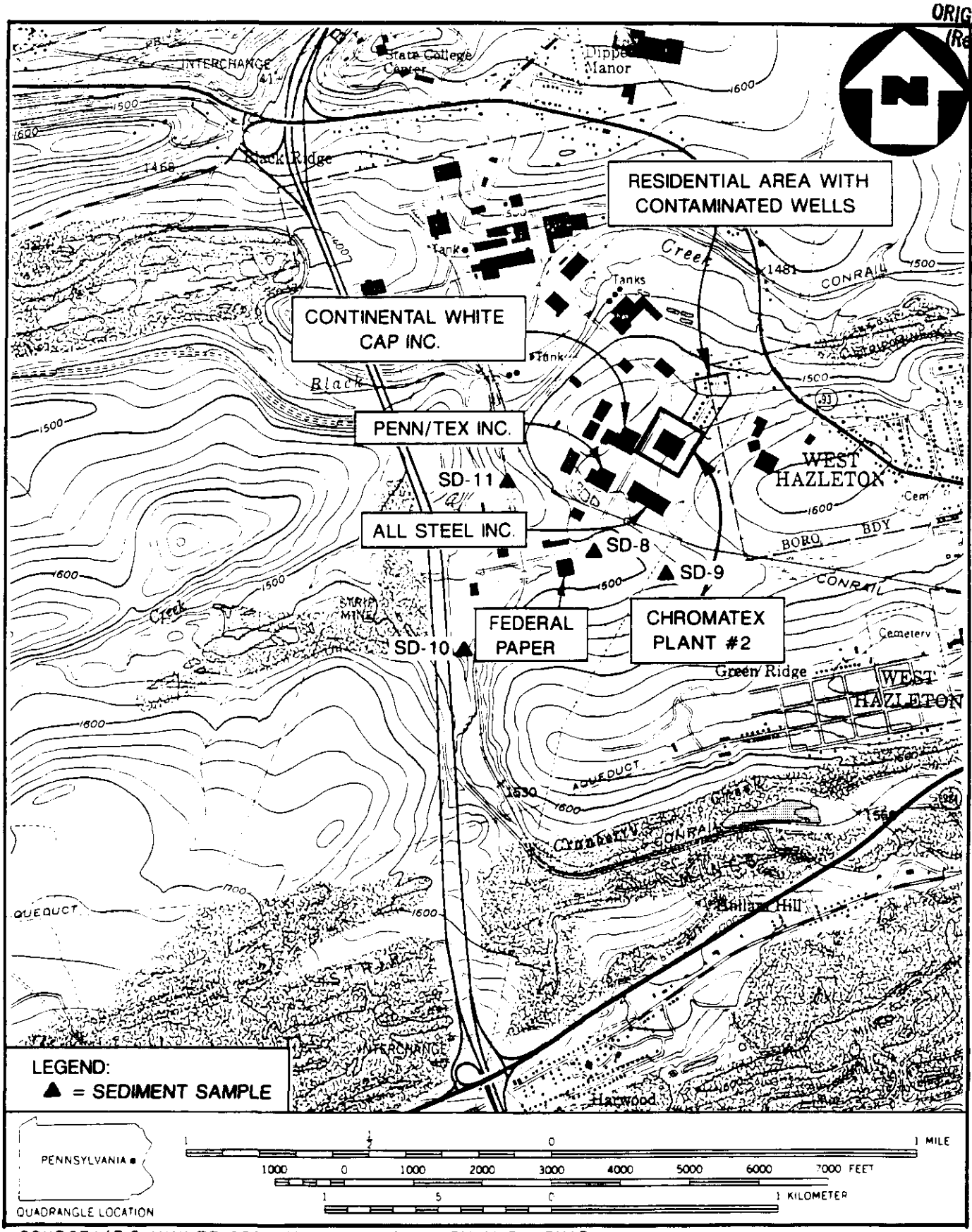
ORIGINAL (Red)



SOURCE: (7.5 MINUTE SERIES) U.S.G.S. CONYNGHAM, PA., QUAD.

PROPOSED OFF-SITE SAMPLE LOCATION MAP

FIGURE 8.2

VALMONT SITE (CHROMATEX PLANT #2), WEST HAZLETON, PA

SCALE 1: 24000

NUS CORPORATION

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ORIGINAL (Red)

Table 8.2
Surface Water Pathway
Data Collection Table

Sample Type	Sample No.	Location	Rationale	Analysis
Sediment (grab)	SD-1	drainage ditch east of Chromatex Plant No. 2, near MW no. 11	identify if hazardous materials have migrated to drainage ditch	organic and inorganic full scan
	SD-2	drainage ditch north of Chromatex Plant No. 2, near MW cluster no. 10	identify if hazardous materials have migrated to drainage ditch	organic and inorganic full scan
	SD-3	drainage ditch north of Chromatex Plant No. 2, near Jaycee Drive	identify if hazardous materials have migrated to drainage ditch	organic and inorganic full scan
	SD-4	drainage ditch south of Chromatex Plant No. 2, near northeastern corner of All Steel, Incorporated	identify if hazardous materials have migrated to drainage ditch	organic and inorganic full scan
	SD-5	drainage ditch south of site, near MW no. 2 and Jaycee Drive	identify if hazardous materials have migrated to drainage ditch	organic and inorganic full scan
	SD-6	drainage ditch paralleling Jaycee Drive, east of All Steel, Incorporated facility	identify surface water releases from site	organic and inorganic full scan
	SD-7	drainage ditch paralleling Jaycee Drive, southwest of All Steel, Incorporated facility	identify surface water releases from site	organic and inorganic full scan
	SD-8	drainage ditch paralleling Jaycee drive, northwest of federal paper facility	identify surface water releases from site	organic and inorganic full scan
	SD-9	intermittent stream south of site, midstream sample	identify surface water releases from site; identify hydrogeological characteristics	organic and inorganic full scan
	SD-10	Cranberry Creek upstream	background sample	organic and inorganic full scan
	SD-11	Cranberry Creek downstream	identify surface water release from site	organic and inorganic full scan

All samples will be collected, decontaminated, packaged, and shipped according to standard protocol specified in the NUS FIT 3 Regional Operations Manual of Standard Operating Guidelines. Specifically, sampling and decontamination procedures will be performed according to SOG I, and packaging and shipping procedures will be performed according to SOP II.

FASP is not recommended for the surface water pathway investigation based on the limited number of samples to be collected and their location.

SECTION 9

9.0 SOIL EXPOSURE PATHWAY

9.1 Significance of Pathway

Based on information gathered during previous investigations at the site, the soil exposure pathway is of significant concern. Further investigation into this pathway is warranted based on the significant levels of TCE found during the on-site soil gas survey performed by TAT and the potential number of targets in relation to the soil exposure pathway. The soil gas survey performed by TAT in 1987 revealed TCE contamination in on-site soil to levels up to 12.5 ppm. Soil sampling performed by PA DER near the underground storage tank revealed TCE levels up to 6,000 ug/kg. Based on these data, it is expected that additional investigation will reveal significant levels of TCE and its related compounds in on-site soils. Soil sampling will assist in determining the actual levels of contamination in soils on site and in the residential areas near the site.

Based on the known contamination of residential home wells in the area, the results of the soil gas survey, and the intervening slope between the site and nearby residents, the likelihood that contaminants have migrated off site is significant. Off-site sampling is necessary to determine if residents near the site are exposed to contamination from the site. In the event that contamination is found to exist within the property boundaries of residents near the site, the effects on the overall ranking of the site will be significant.

9.2 Data Gaps

Further investigation at the site is necessary to collect information pertaining to the targets in relation to the soil exposure pathway. Specifically, soil samples will be collected from residential yards located in the vicinity of the site. The purpose of this sampling is to further characterize the extent of the TCE migration from the site and to determine if any resident individuals in the study area are exposed to Level I contamination.

9.3 Data Collection Strategy

9.3.1 Non-Sampling Data Collection

Non-sampling data collection at the site will include the determination of the site property boundaries and residential property boundaries. Collection of these data is necessary for the determining if contamination at the site has migrated to within the property boundaries of home owners in the study area. The determination of property boundaries will be made by interviewing residents in the study area and examining court records and surveying, if necessary.

9.3.2 Sampling Data Collection

All the sample data collection proposed in section 5.0 can be incorporated into the on-site soil exposure pathway. Refer to section 5.3 for data collection methods.

Additionally, soil samples will be collected from the residential yards northeast of the site to characterize the off-site soil exposure pathway in relation to the human health threat.

The initial off-site soil sampling will consist of the collection of a volatile organic fraction only from the residential yards nearest Chromatex Plant No. 2. The samples will be analyzed by FASP for TCE and its related compounds. If the presence of organic contamination is revealed in the residential yards by FASP, then a sample will be collected from the residences to be analyzed for CLP target compounds (full-scan analysis). The total number of off-site soil samples to be collected is based on the initial screening of samples by FASP. Any off-site sample collected that indicates the presence of organic contamination will be collected for CLP analysis. The sample collection methodology will begin with the sampling of the residences nearest Chromatex Plant No. 2 and will expand to residences at increased distances from the site to residences where FASP reveals no elevated levels of contamination. A minimum of four samples will be collected from the residential yards (see figure 9.1, page 9-3).

A background soil sample will be collected in the wooded area east and upgradient of Chromatex Plant No. 2 (see table 9.1, page 9-4).

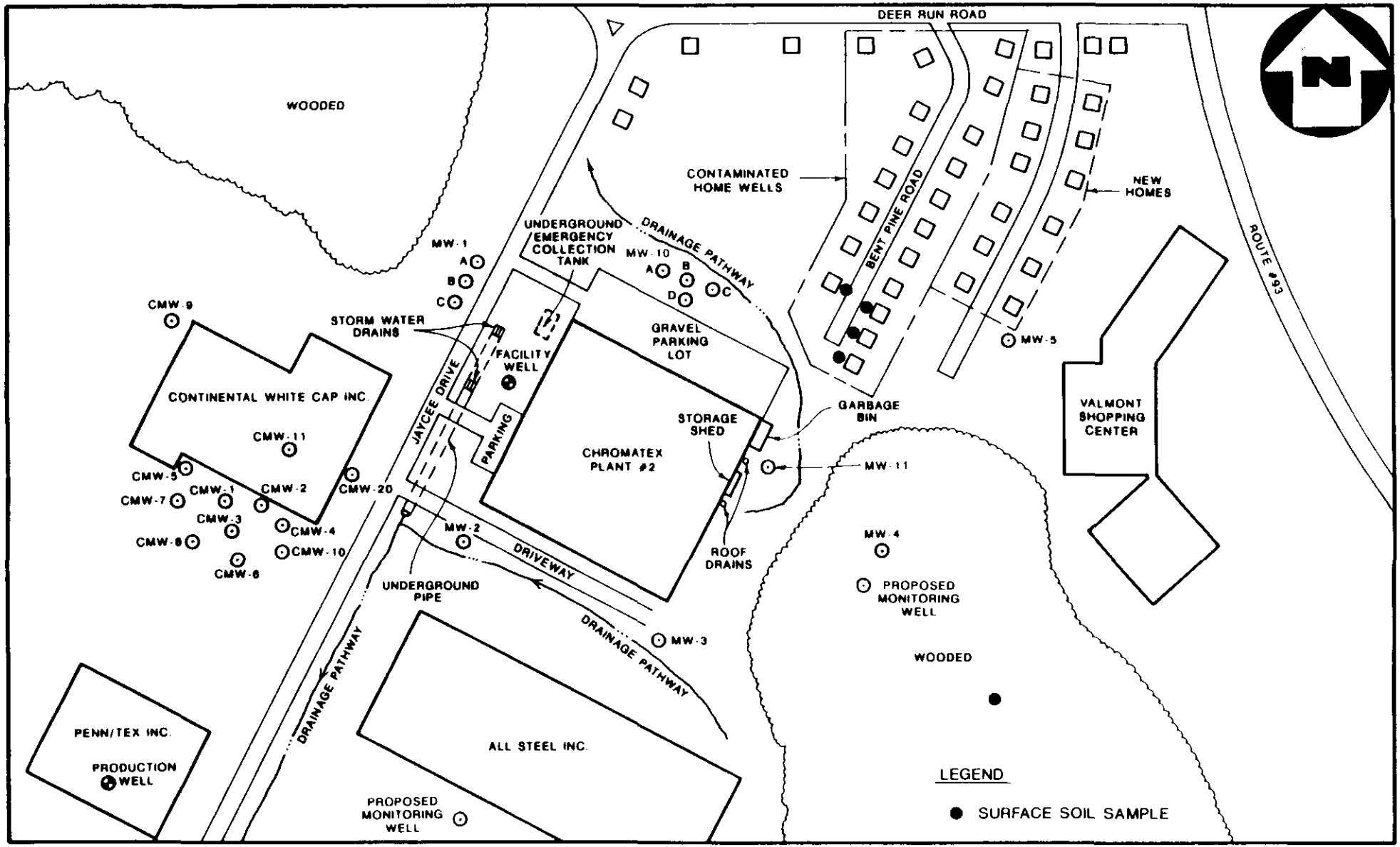

FIGURE 9.1

PROPOSED SOIL EXPOSURE PATHWAY SAMPLE LOCATIONS
VALMONT SITE (CHROMATEX PLANT #2) WEST HAZLETON, PA.

(NO SCALE)

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The samples will be collected, decontaminated, packaged, and shipped according to standard protocol specified in the NUS FIT 3 Regional Operation manual of Standard Operating Procedures and Standard Operating Guidelines. Specially, sampling and decontamination procedures will be performed according to SOG 1, and packaging and shipping procedures will be performed according to SOP II.

Table 9.1
Soil Exposure Pathway
Data Collection Table

Sample Type	Sample No.	Location	Rationale	Analysis
Soil (grab)	S-10I	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic VOCs; FASP
	S-10	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic and inorganic full scan
	S-11I	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic VOCs; FASP
	S-11	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic and inorganic full scan
	S-12I	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic VOCs; FASP
	S-12	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic and inorganic full scan
	S-13I	private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic VOCs; FASP
	S-13	Private residences northeast of Chromatex Plant No. 2	Off-site contamination to Chromatex Plant No. 2; identify potential health threat	Organic and inorganic full scan
	S-14	wooded area east of Chromatex Plant No. 2	background soil	Organic and inorganic full scan

SECTION 10

10.0 PROPOSED SAMPLE COLLECTION REVIEW

10.1 Sample Collection Summary

The number of samples to be collected at the Valmont Site is summarized in the table below.

	Number of Solid Samples			Number of Aqueous Samples			Total for Pathway
	inorganic	organic	full scan	inorganic	organic	full scan	
Source/Waste Characterization	---	---	10*	---	---		10
Groundwater Pathway	---	---	---	29***	---	34*	63
Surface Water Pathway	---	---	11	---	---	2	13
Soil Exposure Pathway	---	---	5	---	---	---	5
Blanks	---	2**	---		---	2	4
Total	---	2	26	29	---	38	95

* Includes duplicate
** VOA only
*** Filtered for dissolved metals

In addition, two MW samples and a soil sample will be designated as matrix spike samples. Extra volumes of bottleware will be obtained for these samples.

SECTION 11

11.0 QUALITY ASSURANCE PROCEDURES FOR SAMPLE RESULTS

11.1 CLP Data

All laboratory data will be validated in order to determine the usability of results for site assessment and to provide oversight of CLP laboratory performance. For individuals involved in site-related decisions, the data validation report presents a clear explanation of issues affecting the application of the data to the site investigation. On the other hand, those EPA individuals responsible for management and oversight of CLP laboratory performance are presented with those issues related to laboratory non-compliance, poor laboratory practice not regulated in the analytical protocol, and any unusual method or analytical problems. For both contractual issues and problems affecting the usability of the data for site assessment, support documentation is sufficient to allow EPA to perform a full-scale review of the data validation in order to substantiate the report's conclusions.

All validation is performed according to the requirements specified in the EPA documents titled "Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses with Modifications for Use within Region 3," and "Laboratory Data Validation, Functional Guidelines for Evaluating Inorganic Analyses. In following these protocols, all raw data are scrutinized in order to determine the confidence concerning the presence (or absence) of each reported compound or element and the extent of quantitative error (bias or variance) associated with each result.

In order to meet the needs of data users, the findings of the review will be formatted to provide a condensed form of the analytical results (data summary). In addition, a text will provide a balanced perspective of data quality by summarizing the usable aspects of the data and areas of compliant laboratory performance, as well as by differentiating problems that have a major versus minor impact on data usability. For each result that is qualified, the report will identify the associated analytical problem or quality control criterion that was not met and explain the resultant effect on the data in simple, concise language that an individual without an extensive background in analytical chemistry can understand.

11.2 FASP Data

All FASP analyses will be performed in accordance with established FASP SOPs, following the quality control (QC) requirements stipulated in these analytical methods. All quality assurance related to these efforts is specified in the FASP SOP 1-1, "Data Reduction, Validation, and Reporting." This SOP specifies the responsibilities, procedures, and records required for FASP quality assurance.

In this SOP, quality assurance functions related to the internal processing of data include the generation of appropriate raw data, the evaluation of identification and quantitation data, and verification of adherence to the analytical method SOP. Calibrations, blank matrix spikes, duplicates, QC check standards, and internal standards QC performance data must be checked. Any problems discovered must be investigated, corrected, and documented in accordance with this SOP.

Internal review of FASP data must be performed by an analyst other than the analyst who performed the analysis. Sample results and QC data must be scrutinized to verify conformance to requirements according to the frequency and following the procedures specified in this SOP.

The data reporting requirements specified in SOP 1-1 address the reporting of results on the data summary, the format and content of the analysis summary report, associated tables, and the supporting raw data appendix. This SOP also specifies requirements for quality assurance records, including injection logbooks, maintenance logbooks, standards logbooks, computer diskettes, and a QC database.

PART IV PROJECT MANAGEMENT

SECTION 12

12.0 PROJECT MANAGEMENT

12.1 Personnel

The project manager's responsibilities for this project include assuring that site access is obtained, directing and overseeing all off-site activities associated with the investigation, and documenting and managing all samples collected. Additional personnel will be assigned to perform various field activities and to assist in the collection and verification of necessary background and site environs data.

12.2 Community Relations

No community relations problems are anticipated. PA DER will be notified of all ongoing activities at the site. Any inquiries by the public about the purpose and time frames of the investigation will be referred to the appropriate contact at EPA.

12.3 Project Costs

The anticipated FIT level of effort (LOE) and estimated subcontractor and analytical costs are found below. A time schedule will be determined and submitted for EPA approval after field activities have been authorized. The use of FASP as a field tool in screening sample locations for CLP analysis is recommended for the subject site.

LOE	1,450 Hours
Subcontractor Costs	$30,000
Analytical Costs	$68,750
Total	$98,750

APPENDIX A

HYDROGEOLOGIC REPORT FOR THE CONTINENTAL WHITE CAP FACILITY WEST HAZLETON, PENNSYLVANIA

29 June 1990

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SECTION 1
INTRODUCTION

1.1 Activities at the Continental White Cap Facility

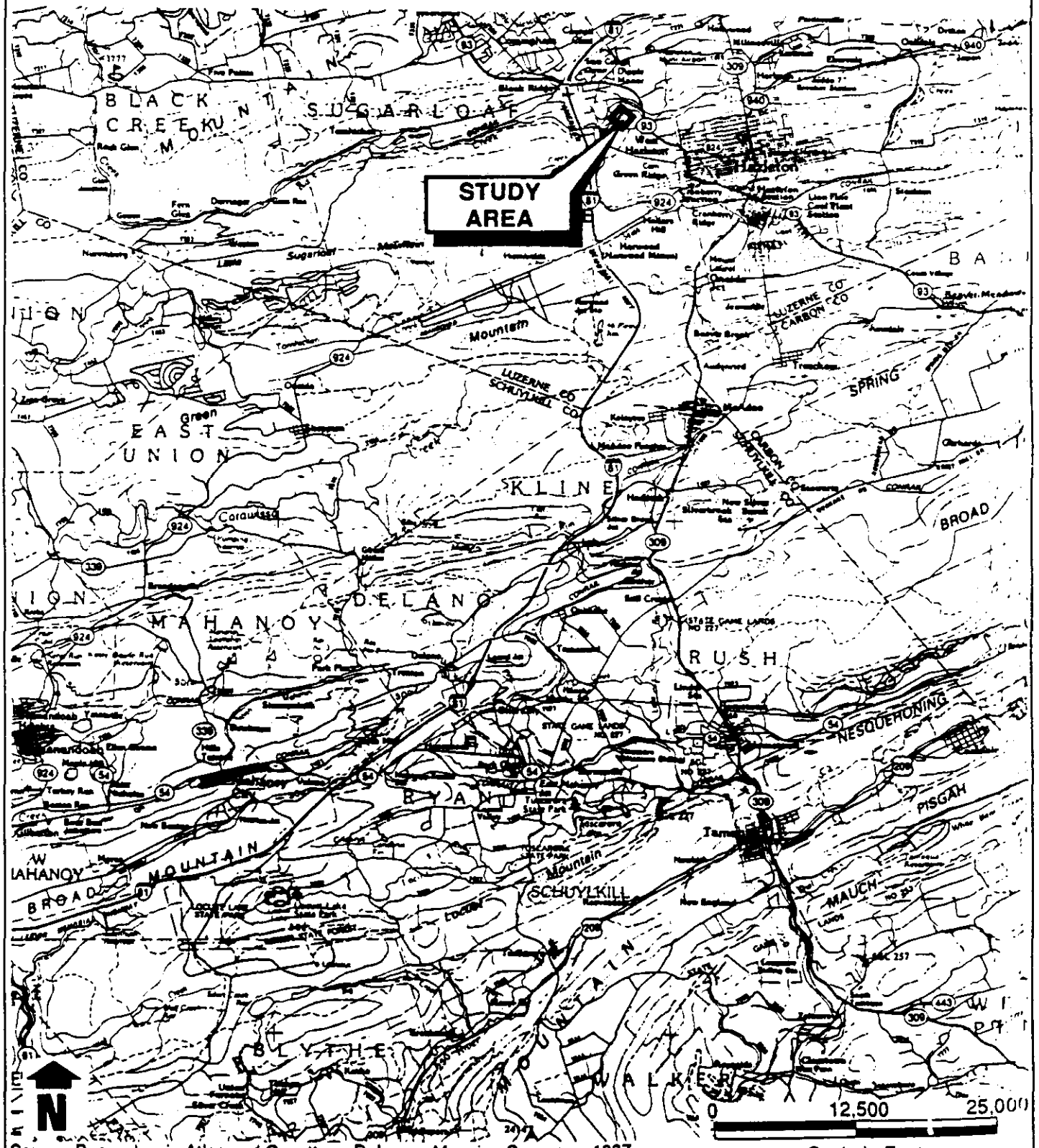
The Continental White Cap (White Cap) facility is located in Northeastern Pennsylvania in the Valmont Industrial Park, near the Borough of West Hazleton, Luzerne County (Figure 1-1). The plant, which opened in 1967, manufactures twist-off closures (caps) for bottles and jars used by the food industry. Coils of sheet steel are decorated to customer specifications and then cut, stamped and formed to produce the cap. Residues from the manufacturing process are then cleaned with a non-chlorinated organic solvent. Both virgin and spent solvents used in the manufacturing process are stored in individual underground storage tanks.

In September 1987, during the routine testing of the underground solvent storage tanks to determine their integrity, an inadvertent loss of an estimated 50 -100 gallons of non-chlorinated solvent occurred. The solvent is actually a blend of several solvents including: total xylenes, 70%; cyclohexanone, 15% and diacetone alcohol, 15%.

The loss was immediately reported to the appropriate regulatory agencies, the Pennsylvania Department of Environmental Resources (PADER) and the United States Environmental Protection Agency (EPA). White Cap then retained Groundwater Technology, Inc. (GTI) to replace the underground tank farm and investigate the extent of contamination in the soil and ground water at the facility. The tank farm has been upgraded to include four 4,000-gallon virgin solvent tanks and one 8,000-gallon waste solvent tank. Each tank is constructed of double-walled, cathodically protected steel and is situated below ground in a tank pit excavation lined with an impervious man-made liner material.

Small quantities of the organic solvent blend "SAF-T-SOL 45" are used by White Cap in its machine shop to clean parts and to wipe down production equipment. This solvent blend consists of 45 percent trichloroethene (TCE), a chlorinated volatile organic compound. Records indicate that "SAF-T-SOL 45" has been used since at least 1981 and there have been no known uncontrolled releases of "SAF-T-SOL 45" into the environment. This solvent is purchased in 55 gallon

Figure 1-1
Study Area Location Map
Continental White Cap, West Hazleton, Pennsylvania



Source: Pennsylvania Atlas and Gazetteer, DeLorme Mapping Company, 1987.

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		Checked by / Date: J. LaRegina 6/27/90	

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drums and used, on the average, at a rate of two to three drums per month. Spent solvent is collected in a 55 gallon drum and stored in a designated drum storage area inside the plant. Accumulated spent solvent is then removed by a licensed hazardous waste transporter for proper disposal.

As part of GTI's contaminant investigation, several ground water monitoring wells were installed and sampled. The analytical results indicated elevated levels of xylene. The data also revealed the unexpected presence of low concentrations of TCE.

1.2 Activities in the Residential Area

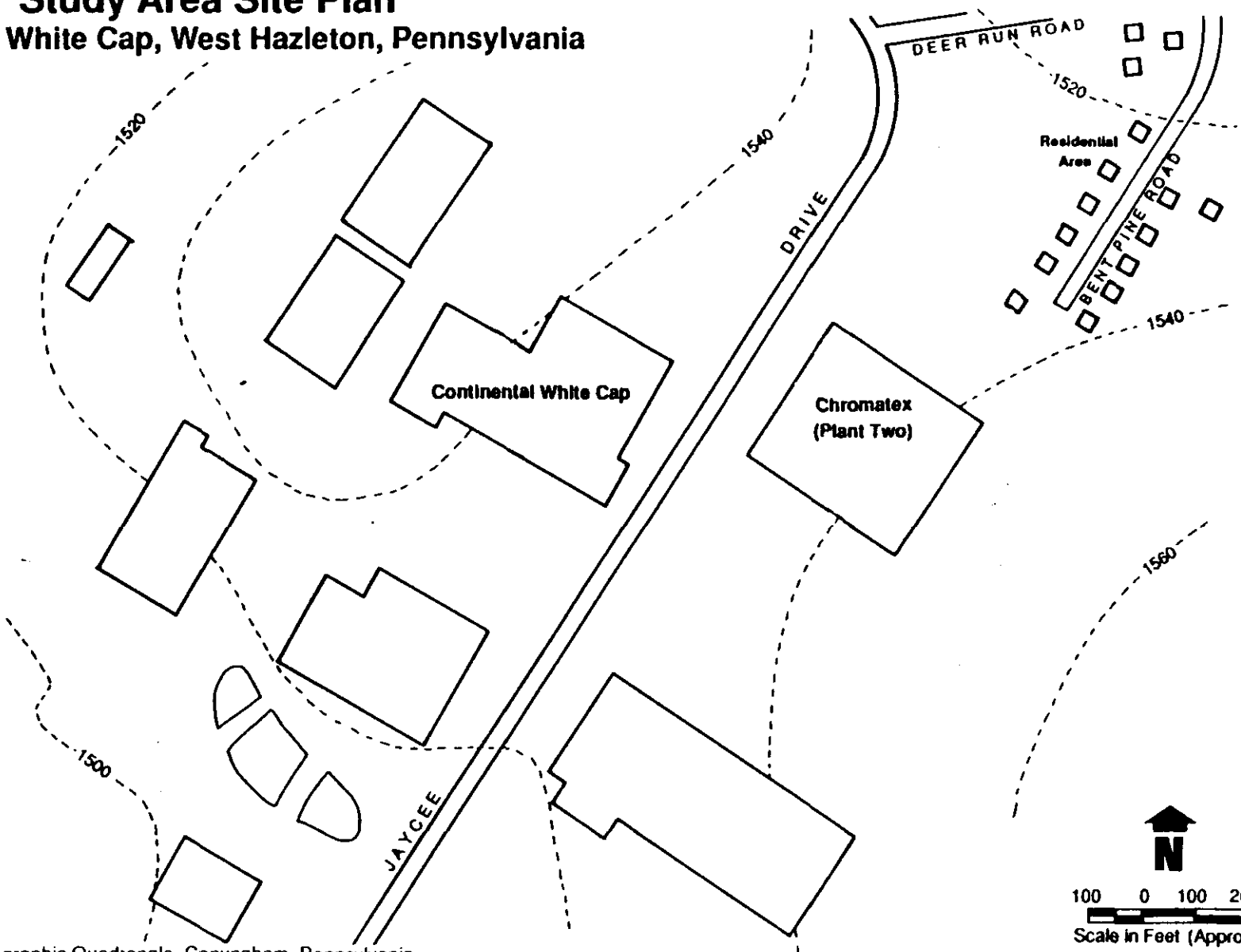
In October 1987, a water sample was collected by White Cap from a private well in the housing development along Deer Run Road and Bent Pine Road (hereinafter, the Residential Area) northeast of White Cap (Figure 1-2). Although no xylene was detected, TCE was found at a concentration of 48 ug/L. Subsequent sampling by the PADER indicated that ground water from nearly all of the wells in the Residential Area which were sampled contained low concentrations of TCE. An investigation by the EPA identified the Chromatex Plant Two (Chromatex) facility, located immediately southeast of the Residential Area as a potential source of the TCE contamination in the residential wells (Figure 1-2). The contaminated individual residential water supplies have since been replaced by municipal water, using monies provided through EPA's Superfund program.

1.3 Activities at the Chromatex Plant Two Facility

Chromatex manufactures latex-backed throw rugs. Rolls of printed woven textile are brought in and cut to size. The cut pieces are then coated on one side with latex and dried. TCE was used in this process. Virgin TCE was stored in above ground storage tanks inside the facility. Floor drains around the latex coating machines carried spent TCE to an outside, below ground waste storage tank (Gogola, S., March 1989 and Personal Communication, August 1989).

The EPA investigation revealed the presence of TCE in the subsurface soils at the facility. As a result, EPA entered into an Administrative Consent Order (ACO) with Chromatex to conduct an investigation of the extent and degree of soil and ground water contamination at the facility.

Figure 1-2
Study Area Site Plan
Continental White Cap, West Hazleton, Pennsylvania



Source: USGS Topographic Quadrangle, Conyngham, Pennsylvania.

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Checked by / Date: J. LaRegina 6/20/90

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Notes:

The ERM Group

1.4 Activities Related to Lawsuit

As co-defendant in Lutz et al. v. Chromatex, Inc. et al., White Cap retained the law firm of Pepper Hamilton & Scheetz (PH&S). PH&S has retained the services of Environmental Resources Management, Inc. (ERM) to provide expert hydrogeological support. This report presents the results of ERM's evaluation of ground water flow and TCE migration in the study area, which included the While Cap facility, the Chromatex facility, and the Residential Area. ERM's investigation of the study area consisted of evaluation of existing data collected recently by various hydrogeologic consultants and government agencies, and locating and installing one monitoring well in addition to the 11 wells already in place on the White Cap property. Through this investigation, ERM has concluded with a reasonable degree of professional certainty, that the White Cap facility is not a potential source of TCE detected in the private wells in the Residential Area.

SECTION 2
SUMMARY OF PREVIOUS INVESTIGATIONS

2.1 Investigation History

ERM's assessment of the hydrogeologic conditions in the study area is based upon review and interpretation of existing ground water quality and ground water elevation data, derived from several investigations conducted by other investigators. This section summarizes the pertinent results of the previous investigations used in ERM's evaluation.

2.2 PADER Investigation - October 1987

In October 1987, PADER collected ground water samples from 27 wells in the Residential Area for volatile organic compounds (VOC) analysis. TCE was detected in 26 of the 27 wells sampled, at concentrations ranging from 1 ug/L to 1,400 ug/L (Tucker, Mark. April 1988). In addition, trichloroethane (TCA) was detected in 26 of 27 wells at concentrations ranging from 2.3 ug/L to 450 ug/L. A nearby service station well was also found to contain low level VOC contamination that was judged to be from a source(s) unrelated to the study area (Tucker, Mark. April 1988).

2.3 EPA Investigation - October 1987

Also in October 1987, the EPA conducted an investigation of the Residential Area and adjacent Valmont Industrial Park area through its contractor, Weston SPER. The investigation consisted of the following:

- Preparation of a potentiometric surface (water table) contour map using water level measurements from accessible residential wells.
- Preparation of a TCE isoconcentration map using the potentiometric surface map, and TCE data from the PADER sampling.
- A soil gas survey at the Chromatex site, to identify potential areas of subsurface VOC contamination. (A soil gas survey measures the presence or absence of VOC vapors in the pore spaces of soil. The VOCs may be present through spillage and adsorption onto the

soil, or by vapor migration upward into the soil from underlying VOCs in ground water.)

The Weston SPER investigation resulted in the following findings:

- Pockets of high soil gas TCE concentrations were found at several locations on the Chromatex site, as close as 200 feet from the most highly contaminated residential well.
- An underground storage tank contained a high concentration of TCE, 1,110 mg/L, in the air space above the tank's liquid contents.
- Ground water flows from Chromatex in a northeasterly direction toward and through the Residential Area.

Details of the investigation are contained in a 28 October 1987 Weston SPER memorandum, which is included herein as Appendix A.

2.4 Investigations at the White Cap Facility

Investigation of the xylene contamination at the White Cap facility by GTI is currently on-going. To date, the investigation has involved three phases of field activities, including the analysis of composite soil samples collected from the underground storage tank area following tank replacement, and the installation and sampling of 11 ground water monitoring wells. The results of the investigation thus far are as follows:

- Analysis of ten composite soil samples collected during November 1988 indicated total xylene concentrations of up to 48 ug/Kg (equivalent to 48 ppb). No TCE was detected at a detection limit of 4 ug/Kg. (Groundwater Technology, Inc. March 1989)
- Analysis of ten additional composite soil samples from the same area, collected in December 1988, indicated no xylenes were detected. TCE was reported in one sample at a very low concentration, below the detection limit of 1.9 ug/Kg. (Groundwater Technology, Inc. March 1989)
- Two rounds of samples, collected from the soil beneath the former underground storage tanks in December 1988 and February 1989, contained total xylenes at concentrations ranging from less than 4 ug/Kg to 230,000 ug/Kg. No TCE was detected at detection limits of 500 ug/Kg and 1.9 ug/Kg, respectively. (Groundwater Technology, Inc. March 1989)

- Samples collected in February 1989 from the excavated trench which carried a former waste solvent line to an underground storage tank, contained total xylenes from less than 4 ug/Kg to 179,000 ug/Kg. No TCE was detected at detection limits of 1.9 ug/Kg and 500 ug/Kg. (Groundwater Technology, Inc. January 1990)
- The same trench was resampled in May 1989 and contained no xylenes or TCE at a detection limit of 500 ug/Kg. (Groundwater Technology, Inc. January 1990)
- A thin layer of free-phase xylene solvent is present on top of the ground water table in two wells in close proximity to the underground tank farm. (Groundwater Technology, Inc. March 1989)
- Xylenes are the predominant VOCs found in the ground water. In September 1989, all GTI-installed wells were sampled in a single sampling event. Total xylenes were present at concentrations ranging from 5.9 ug/L to 120,000 ug/L. (Groundwater Technology, Inc. January 1990)
- During the September 1989 sampling event, TCE was detected in five of the 11 wells, at concentrations ranging from 190 ug/L to 2,600 ug/L. (Groundwater Technology, Inc. January 1990)

A complete summary of all TCE data from the White Cap site is presented in Section 4.

2.5 Investigations at the Chromatex Facility

As part of the ACO agreed to with the USEPA, Chromatex retained International Exploration Inc. (Intex) to conduct an environmental investigation, which included the sampling and analysis of soil, and the installation, sampling, and analysis of 12 ground water monitoring wells. The results of this investigation are as follows:

- In November 1987, 11 soil samples were collected along the excavation of a former line which fed an underground waste storage tank. TCE was detected in a range from less than 5 ug/Kg to 5,600 ug/Kg. Split samples analyzed by PADER contained TCE in concentrations from 50 ug/Kg to 1,800,000 ug/Kg. (Geraghty & Miller, January 1990)

- In December 1987, 14 soil samples were collected from several test pits. TCE was detected in concentrations from 5 ug/Kg to 488,000 ug/Kg. (International Exploration, Inc. January 1989)
- Twelve monitoring wells were installed in December 1987. Four of the 12 wells contained TCE in concentrations ranging from 600 ug/L to 17,000 ug/L. (International Exploration, Inc. January 1989)
- A ground water divide trends roughly East-West across the center of the site with components of ground water flow to the north, south and west. (International Exploration, Inc. January 1989)

2.6 Geraghty & Miller Investigations

In July 1989, Geraghty & Miller (G&M), a hydrogeological consultant retained by the Plaintiffs' counsel, collected four soil and four water samples in the Residential Area. The soil results indicated that no VOCs attributable to environmental degradation were present. Two residential wells (Reznick and Sabatini) no longer in service were sampled, and contained TCE at 180 ug/L and 62 ug/L, respectively. In addition, TCA was also detected at these two wells at 22 ug/L and 15 ug/L, respectively. No VOCs attributable to environmental degradation were present in samples collected from the municipal water supply system, nor from basement sump sampling locations at two remaining homes.

In August 1989 a complete round of water level measurements was collected from the 12 Chromatex wells and 11 White Cap wells. The results are summarized in Section 4.

Soil samples were also collected from the Chromatex and White Cap facilities during the August field activities. Five soil samples were collected from the Chromatex site at various locations, corresponding to areas of surface water runoff and waste handling and storage. The results indicated that TCE was present at concentrations ranging from 5 ug/L to 32 ug/L.

Two soil samples were collected from the White Cap site on the opposite (northern) side of the facility from the underground storage tanks. These samples were split with ERM and analyzed by an independent laboratory. The results of both sets of data indicated that no TCE was detected in the soil at the White Cap site. Analytical results from the ERM split samples are contained in Appendix B.

The data collected during these field activities were presented in a report dated January 1990 and a supplemental letter report dated 4 April 1990. The conclusions drawn from these data as well as G&M's review of existing data were:

- Chromatex is one source of the TCE found in the residential wells
- White Cap is a potential source of the TCE found in the residential wells
- The orientation of bedrock fractures as well as the pumping of the residential wells appears to alter the direction of ground water flow, such that contaminants from White Cap can migrate to the residential wells.

Further details of these two reports are discussed in Sec 4.4.

SECTION 3
PHYSICAL SETTING

3.1 Topography

Both the White Cap and Chromatex facilities are situated on the edges of a slight topographic "saddle", along the crest of a small ridge which trends roughly East-West (Figure 3-1). The approximate average elevation at the White Cap facility is 1,535 feet Mean Sea Level (ft MSL). Immediately to the east of White Cap is the Chromatex facility, which is situated at an approximate average elevation of 1,540 ft MSL. The ridge serves as a divide, directing surface water runoff to the North-Northeast and to the South-Southwest.

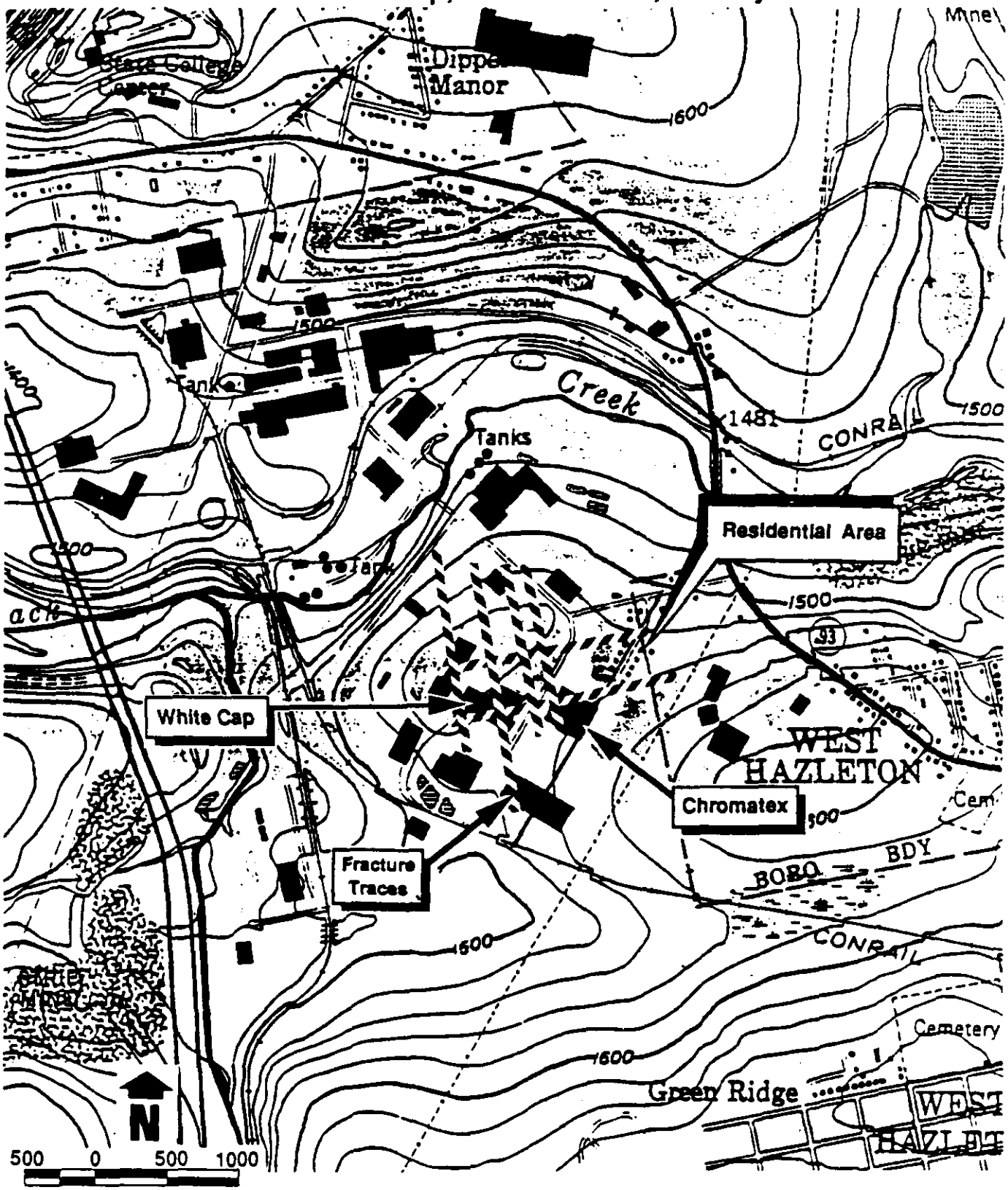
The Residential Area is situated on the gently sloping northern flank of the ridge at an elevation range of approximately 1,510 to 1,535 ft MSL. The area is comprised of approximately 27 single family homes and an apartment house which abut the northeastern property line of the Chromatex facility (See Figure 1-2).

3.2 Geology

The study area is located in the Valley and Ridge Physiographic Province of Pennsylvania. This province is characterized by bedrock units that have undergone intense folding and faulting to create alternating synclines and anticlines which trend approximately northeast-southwest. Differential erosion along the anticlines and synclines has created a series of parallel valleys and ridges.

The bedrock units in the Hazleton Area comprise what is known as the Eastern Middle Anthracite Coal Field. The anticlines are underlain by resistant sandstone and conglomerate of the Pottsville Group Formations. The geologic map of the Hazleton Area is shown in Figure 3-2. The study area is underlain entirely by the Pottsville Group Formations. Monitoring well drilling logs by ERM, Intex and GTI confirm subsurface conditions similar to the published literature. Based upon measurements taken by Weston SPER, the strike of the Pottsville Formation is approximately North 40° - 50° East (Tucker, Mark. 1987). This is in contrast to the more east-northeasterly (approximately 80°) regional strike evident from the topographic alignment of the ridge section immediately to the east. The dip of the

Figure 3-1
Topography in the Vicinity of the Study Area
Continental White Cap, West Hazleton, Pennsylvania



Source: USGS Topographic Quadrangle, Conyngham, Pennsylvania.

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Figure 3-2
Area Geologic Map
Continental White Cap, West Hazleton, Pennsylvania

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		Checked by / Date: J. LaRegina 6/27/90	

bedrock units beneath the White Cap and Chromatex sites is very slight to essentially flat (International Exploration, 1989).

3.3 Fracture Trace Analysis

Fracture trace analysis is interpretation of stereo pair aerial photographs to identify linear features which may represent surface manifestations of fractures in the underlying bedrock. In bedrock, ground water flow occurs principally along such fractures in which enhanced permeability provides conduits for ground water flow.

ERM conducted a fracture trace analysis of the study area using several sets of historical aerial photographs, dating to the 1950s prior to the construction of the Valmont Industrial Park. The results of this analysis identified seven principal linear features, which are shown on Figures 3-1 and 4-1

Six of the seven features appear to be grouped into two distinct groups based upon their orientations. The first group is comprised of two features which trend approximately North 75° East. The second group of four features is oriented North 10° West. The two distinct groupings of features, as well as the uniformity of orientation of the features within each group, suggests a structural grain or preferred pattern to the bedrock fractures in the study area. These preferentially oriented fractures appear to serve as controls on the movement of ground water in the study area as will be discussed in Section 4.

A single feature is also shown trending North 40° East, extending from the rear of the Chromatex facility northeastward through the Residential Area. The apparent change in regional bedrock strike direction (as reported by Weston SPER) occurs just west of this feature; thus, this fracture may represent a fault (or major fracture, along which movement of the earth has occurred), which may also represent a preferential pathway for ground water flow.

SECTION 4
HYDROGEOLOGY AND TCE MIGRATION IN THE STUDY AREA

4.1 Potentiometric Surface Mapping

To determine ground water flow directions in the study area, ERM has prepared a potentiometric surface map (or ground water contour map), using water level measurements collected by G&M on 2 August, 1989 (Figure 4-1). The ground water elevations at the wells measured are summarized on Table 4-1.

At the White Cap facility, data from monitoring wells MW-1 through MW-10, (installed by GTI); and MW-20 (installed by ERM), were used in constructing the map. MW-20 was installed by ERM in July 1989 after initial review of existing data. It is constructed to a depth similar to those of the GTI wells. Appendix C contains the lithologic and construction log for this well. The water level data collected by G&M from Chromatex shallow monitoring wells MW-1A, MW-2, MW-3, MW-4, MW-5, MW-10A and MW-11A were also used in conjunction with the White Cap data to construct the map.

Since the monitoring wells used in preparation of the map were installed at different times and by different contractors, it was important to ensure that a common datum was used to determine the top-of-casing (TOC) elevation of each well. To ensure that the data collected on 2 August 1989 from both sites could be used together, ERM project personnel "tied in" the two surveys, using the elevation of White Cap well MW-20 as a bench mark, to survey the elevation at Chromatex well MW-1A. The results of the survey indicated that there is no significant difference between the two datum elevations used to survey the wells and that the 2 August 1989 water level data from both facilities can be used together. A difference of only 0.19 feet was calculated between the two surveys, indicating that the datum used at White Cap was 2.28 inches lower in elevation than the Chromatex datum. This difference is not significant in that the relative elevation between the water levels on the Chromatex and White Cap sites is on the order of several feet.

Once the validity of using the data from both sites was established, ERM constructed a potentiometric surface map for the study area,

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Table 4-1
Potentiometric Surface Data
2 August 1989
Continental White Cap
West Hazleton, Pennsylvania

Continental White Cap Monitoring Wells	Time	Top of Casing Elevation (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevation (feet MSL)
MW-1	1606	1537.07	19.81	1517.26
MW-2	1556	1537.34	19.81	1517.53
MW-3	1507	1536.18	12.13	1524.05
MW-4	1503	1537.29	11.40	1525.89
MW-5	1457	1534.33	16.51	1517.82
MW-6	1440	1531.66	20.61	1511.05
MW-7	1449	1533.59	15.27	1518.32
MW-8	1454	1533.55	16.88	1516.67
MW-9	1533	1535.77	25.60	1510.17
MW-10	1501	1534.95	16.63	1518.32
MW-11	*	1539.04	*	*
MW-20	1522	1538.47	19.77	1518.70

Chromatex Plant Two Monitoring Wells	Time	Top of Casing Elevation (feet MSL)	Depth to Water (feet)	Potentiometric Surface Elevation (feet MSL)
MW-1A	1210	1547.34	28.27	1519.07
MW-1B	1217	1547.91	35.41	1512.50
MW-1C	1200	1547.88	35.51	1512.37
MW-2	1258	1536.07	11.56	1524.51
MW-3	1249	1536.33	23.10	1513.23
MW-4	1355	1552.60	16.90	1535.70
MW-5	1805	1538.77	14.01	1524.76
MW-10A	1319	1537.39	21.95	1515.44
MW-10B	1315	1538.16	27.94	1510.22
MW-10C	1311	1539.00	29.27	1509.73
MW-10D	1323	1538.33	DRY	-
MW-11	1333	1539.73	10.10	1529.63

* White Cap well MW-11 did not exist at time of measurement.

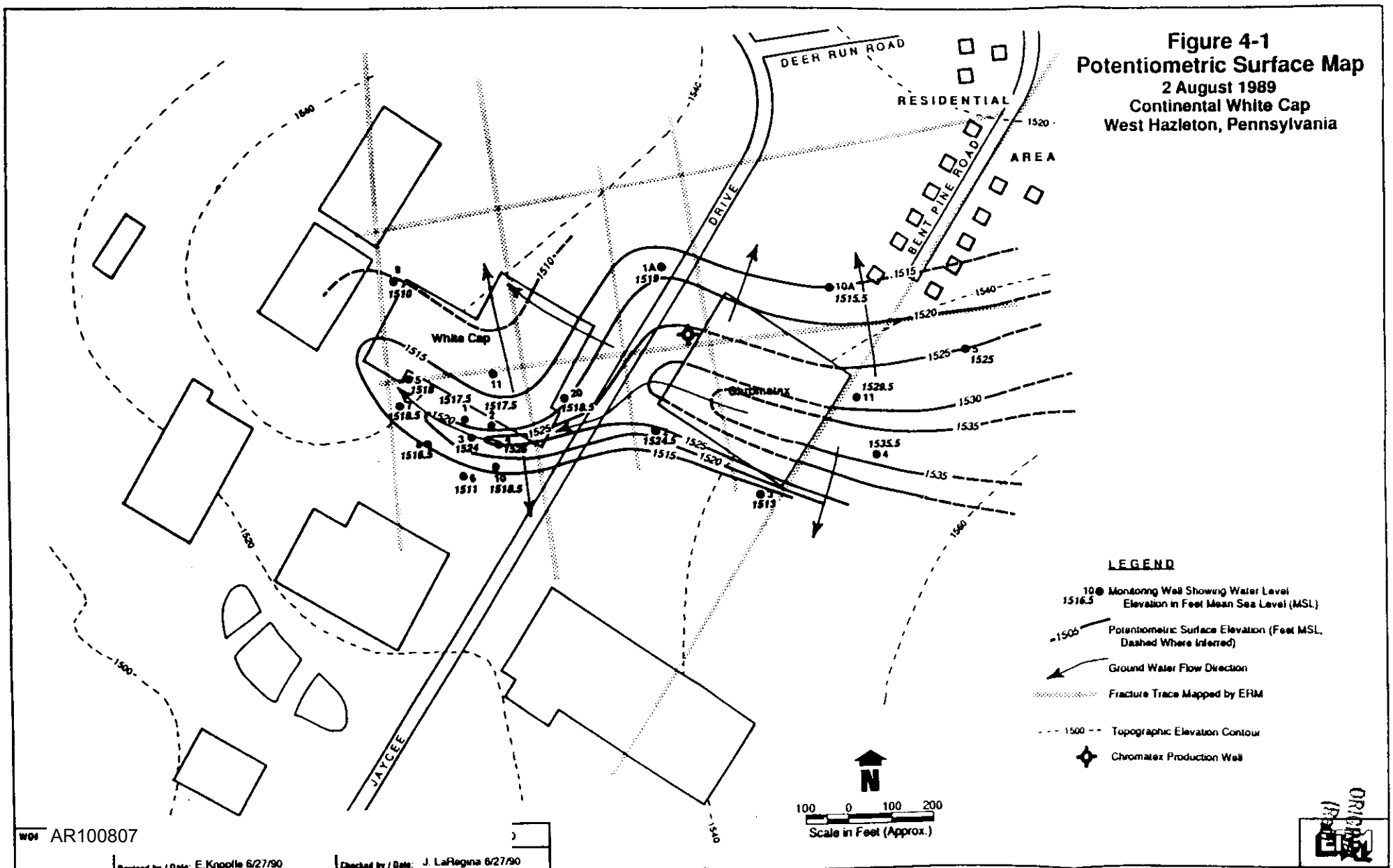

Figure 4-1
Potentiometric Surface Map
2 August 1989
Continental White Cap
West Hazleton, Pennsylvania

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Revised by / Date: E.Knopfle 6/27/90

Checked by / Date: J. LaRegina 6/27/90

using the 2 August, 1989 water level data collected by G&M. That map is shown in Figure 4-1.

4.2 Ground Water Flow Directions

4.2.1 Ground Water Flow Directions - August 1989

Figure 4-1 represents natural ground water flow in the study area, unaltered by local pumping, as the residential and Chromatex wells are no longer in use. The figure illustrates that a ground water divide occurs beneath the study area. Recalling the ridge line location of the study area, the divide follows the same approximate east-west orientation as the ridge, particularly beneath the Chromatex facility.

It can be seen on figure 4-1 that ground water flow from the Chromatex facility occurs in three main directions:

- north-northeast to north-northwest from elevation +1,535 ft MSL beneath the plant building, to at least 1,515 ft MSL in the Residential Area to the northeast;
- south-southwest from elevation +1,535 ft MSL beneath the plant to at least 1,515 ft MSL in the vacant field to the south;
- north-northwest, toward the White Cap property, from elevation +1,535 to elevation +1,510.

In addition, a minor flow component can occur to the west-northwest, parallel to the divide, from elevation +1,535 ft MSL beneath the building to 1,525 ft MSL midway between Chromatex and White Cap.

Further to the west, beneath the White Cap facility, the ground water divide narrows, and intersects the southeastern corner of the White Cap building, passing in close proximity to the underground storage tank area. Two main components of ground water flow are evident:

- southward from elevation +1,525 ft MSL to 1,515 ft MSL, and
- north-northwestward, from elevation +1,525 ft MSL to 1,510 ft MSL, along a "trough" in the potentiometric surface.

Again a minor east to west component is present parallel to the narrow divide.

It is clear from Figure 4-1 that ground water flows to the north toward the edge of the Residential Area, from the Chromatex facility. However, the northerly component of ground water flow from the

White Cap site is to the north-northwest, away from the Residential Area. In fact, this northerly flow component, directed along the "trough" in the potentiometric surface, is coincident with a large northwest trending fracture trace mapped by both G&M (Geraghty & Miller, January 1990) and ERM. Thus, this fracture appears to act as a pathway of preferred flow from White Cap, to the north-northwest.

Three factors suggest that TCE present in the ground water at White Cap could have originated on the Chromatex site. As is clear from Figure 4-1, the east-west component of ground water flow along the ground water divide, in conjunction with the east-west oriented fracture set, could provide a pathway for contaminants to migrate from Chromatex to White Cap. Second, the detection of 2,200 ug/L of TCE (Geraghty & Miller, January 1990) in the 400 feet deep Chromatex production well supports this possibility, particularly for White Cap well MW-11. The possibility that Chromatex is the source of TCE beneath the White Cap facility is further supported by the fact that very high levels of TCE are present in the soil at Chromatex, compared to essentially no TCE (<1.9 ug/Kg at one location only) in soils on the White Cap site.

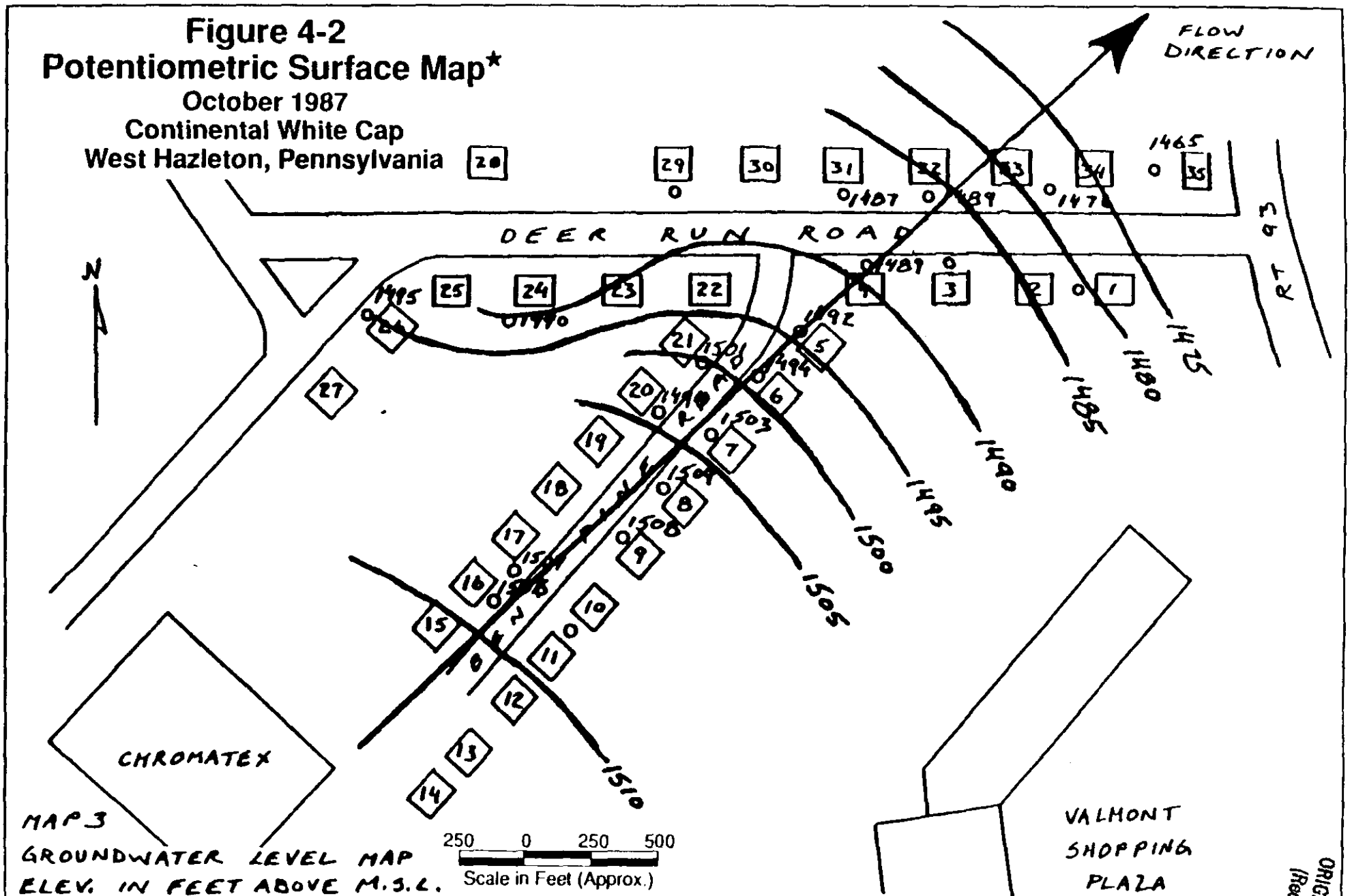
4.2.2 Ground Water Flow Directions - October, 1987

In October, 1987, Weston SPER measured water levels at several of the affected residential wells, and constructed a potentiometric surface map, in an effort to define the source of the TCE in those wells. That map, shown in Figure 4-2, represents the ground water flow conditions near the residences before public water was installed, when the wells were periodically pumped for water supply.

The potentiometric surface contours indicate that pumping of the wells shifted the ground water flow direction from its natural north-northwest direction, to north-northeast, directly from Chromatex toward the residential wells. This is coincident with the fault/fracture trace mapped by ERM through the residential area; thus this fracture appears to have channeled flow from Chromatex to the residential wells under pumping conditions.

The map also shows that west of the homes on Bent Pine Road, the contours bent southward, indicating a shift of the flow direction northwestward. If the White Cap facility were a source of the TCE at the residential wells, a gradient toward the northeast would be expected in this area. Thus, based on the EPA-contracted work done by Weston SPER, there is no indication of flow gradients toward the

Figure 4-2
Potentiometric Surface Map*
October 1987
Continental White Cap
West Hazleton, Pennsylvania



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Residential Area from the White Cap facility, under pumping conditions at the residential wells. Rather, the overall northwest topographic gradient appears to maintain control on the flow system, and flow is not reversed from White Cap to the northeast along the east-west trending fracture set.

4.3 TCE Migration in the Study Area

TCE has been detected in the shallow ground water beneath the Chromatex facility at concentrations ranging from 600 ug/l to 17,000 ug/l. On the White Cap property, TCE has been detected in ground water at concentrations ranging from 33 ug/l to 2600 ug/l. Table 4-2 summarizes the historical TCE ground water data from both sites. Although exact conditions are not defined, it is possible that the TCE on the White Cap property may have migrated from the Chromatex property, along the flow component parallel to the ridge axis.

On the White Cap property, TCE is present both north and south of the ground water divide, and therefore would be expected to migrate south, and north-north west along the trough in the potentiometric surface. The potentiometric map shown in Figure 4-1 clearly indicates that, under natural flow conditions, TCE does not migrate northeastward toward the Residential Area. In addition, under historical conditions, when the residential wells were pumping (as depicted by Weston SPER) no evidence was seen of a gradient shift from White Cap toward the Residential Area. The only gradient shift seen was from Chromatex, where flow became directed from the TCE source area near well MW-11, north-northeastward along an apparent fault/fracture directly to the Residential Area.

Further evidence that White Cap is not a source of TCE at the residential wells is provided by the TCE concentration data. The historical data indicate TCE concentration maxima of 17,000 ug/l at Chromatex in well MW-11, 1,200 ug/l at White Cap well MW-11, and 1,400 ug/l in one residential well. Granting that the principal source of the TCE in the Residential Area is Chromatex, the minimum concentration reduction factor from Chromatex to the nearest residential well can be approximated at 17,000/1,400, or 12.14 times. This occurs along the fault/fracture, over a distance of about 300 feet. The maximum concentration detected north of the ground water divide on the White Cap property is 1,200 ug/l at MW-11. The distance to the residential wells along the east-west fracture set north of MW-11 is about 1,000 feet. At this distance, with a reduction factor

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Table 4-2
GROUND WATER TCE CONCENTRATIONS IN THE STUDY AREA
CONTINENTAL WHITE CAP
WEST HAZLETON, PENNSYLVANIA

CHROMATEX PLANT TWO MONITORING WELLS	DECEMBER 1987	MAY 1988	JUNE 1988	OCTOBER 1988	SEPTEMBER 1989
MW-1A	-	ND	-	-	-
MW-2	-	600	-	-	-
MW-3	-	ND	-	-	-
MW-4	-	ND	-	-	-
MW-5	-	ND	-	-	-
MW-10A	-	9900	-	-	-
MW-11	-	17000	-	-	-

CONTINENTAL WHITE CAP MONITORING WELLS	DECEMBER 1987	MAY 1988	JUNE 1988	OCTOBER 1988	SEPTEMBER 1989
MW-1	180	-	-	NS*	<190
MW-2	NS*	-	-	NS*	<190
MW-3	33	-	-	270	<190
MW-4	-	-	ND	ND	ND
MW-5	-	-	ND	ND	<190
MW-6	-	-	19	200	250
MW-7	-	-	-	-	<190
MW-8	-	-	-	-	2600
MW-9	-	-	-	-	83
MW-10	-	-	-	-	190
MW-11	-	-	-	-	1200
MW-20	-	-	-	-	NS

NA - NOT ANALYZED
NS - NOT SAMPLED
ND - NOT DETECTED
* - CONTAINS FREE PRODUCT
ALL UNITS IN UG/L

of 12.14 times every 300 feet, no TCE from White Cap would be detectable in the Residential Area, even if a gradient had been established from White Cap toward the residential wells under pumping conditions. Again, the data indicate that no such gradient existed.

4.4 Evaluation of G&M's Hydrogeology Reports

As part of ERM's interpretation of the hydrogeology of the study area, two recent reports by G&M were reviewed. These reports included:

- *Hydrogeologic and Ground-Water Quality Conditions in the Southeast Section of the Valmont Industrial Park and Vicinity, West Hazleton, Pennsylvania*, dated January 1990
- Supplemental letter report, dated 4 April 1990

In the January 1990 report, G&M presents information regarding the concentrations of TCE in ground water, and flow directions in the bedrock aquifer beneath the Chromatex facility and the Residential Area. Also postulated were potential deviations of the natural ground water flow along bedrock fractures, in response to pumping and use of ground water from residential wells. Based on their analysis, G&M concluded that, "the Chromatex facility is a source of the TCE contamination of the residential water supply." G&M also concluded that the White Cap facility "cannot be dismissed..." as a possible source. This conclusion was basically reiterated in the 4 April 1990 letter report.

G&M's approach for determining the source area for the TCE contamination was to evaluate water level and water quality data collected by various parties, and to relate these data to geologic features, such as fracture traces, to determine possible directions of ground water flow toward the Residential Area. These are standard techniques used in the practice of hydrogeology.

In a departure from standard techniques in the field of hydrogeology, G&M failed to integrate all of the relevant data into a comprehensive areal definition of hydrogeologic conditions. Specifically, G&M collected water level data from both the Chromatex and White Cap wells on 2 August 1989. Yet in their January 1990 report, they prepared a potentiometric surface map using only the Chromatex well data. Then, in the April 1990 letter report, G&M prepared a potentiometric surface map using only the White Cap well data. Using this map, they concluded that a natural component of flow occurs

north-northeastward from White Cap, toward the Residential Area. Based on that conclusion, G&M speculates that White Cap "cannot be dismissed as a possible source" of TCE contamination in the residential water supply." (Geraghty & Miller. January, 1990).

If G&M had compared the Weston SPER October 1987 potentiometric surface map with a potentiometric surface map prepared using all of the 2 August 1989 data, it would have been evident that residential pumping influences do indeed cause a shift in ground water flow direction. The shift, however, draws contaminants from the Chromatex facility and not the White Cap facility.

ERM has shown through our own evaluation, that when all the data collected by G&M on 2 August 1989 are plotted on a single map and evaluated, it is clear that natural ground water flow from White Cap is directed to the north-northwest, away from the Residential Area.

SECTION 5
SUMMARY AND CONCLUSIONS

5.1 Summary

- Trichloroethene has been detected in ground water at residential wells near the Valmont Industrial Park. These wells were used for water supply.
- Soil gas survey data and numerous laboratory analyses indicate the presence of TCE at many locations in the soil at the Chromatex facility, adjacent to the affected residential area. In fact, a TCE source area, which has contaminated ground water has been documented at the northeast corner of the Chromatex plant, near well MW-11.
- No TCE has been detected in the soil at the White Cap facility, nor has any known release been documented at White Cap which would account for the presence of TCE in the ground water.
- Based upon the interpretation of a potentiometric surface map of the study area, a generally east-west trending ground water divide is present beneath the Chromatex and White Cap facilities.
- The major components of ground water flow occur generally to the north and south from both the Chromatex and White Cap facilities.
- Under natural conditions, the northerly component of ground water flow from the TCE source area on the Chromatex property heads toward the west edge of the Residential Area. Under pumping conditions at the residential wells, this flow is diverted directly beneath the Residential area, likely along a fault/fracture mapped by ERM.
- The northerly component of ground water flow from the White Cap facility heads in a north-northwesterly direction away from the Residential Area, likely along a fracture mapped by both G&M and ERM. Data collected during the period when the residential wells were still serving as water supplies do not show a gradient reversal northeastward, from White Cap toward the Residential Area.

- A minor east-west component of ground water flow occurs from the Chromatex facility toward the White Cap facility; thus it is possible that TCE detected beneath the White Cap property may have originated at Chromatex.
- The distribution of TCE concentrations in the study area ground water is not consistent with the premise that TCE detected beneath the White Cap property may be a source of contamination in the Residential Area wells.

5.2 Conclusions

- Based upon the existing data, ERM concludes that the Chromatex facility is the source of TCE at the affected residential wells.
- Based upon the existing data and on past and current ground water usage in the area, ERM concludes that the Continental White Cap facility has not been, and is not a source for the TCE contamination at the residential wells adjacent to the Valmont Industrial Park.
- Based upon the existing data and under current conditions of ground water withdrawl and usage, ERM concludes that the Continental White Cap facility will not be a potential source for future migration of TCE to the residential wells.

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Personal Communications, August 1989. Shawn Gogola of Chromatex to Jim LaRegina of ERM during August 1989 Chromatex facility tour.

Tucker, Mark. April 1988. Memorandum to David Wright EPA Region III from Mark Tucker Weston SPER regarding source of contamination for the Telerico Well, April 1988.

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APPENDIX A

ORIGINAL (Red)

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TECHNICAL ASSISTANCE TEAM FOR EMERGENCY RESPONSE REMOVAL AND PREVENTION
EPA CONTRACT 68-01-7367

MEMORANDUM

TO: David Wright, OSC, U.S. EPA Region III PCS #1444

THRU: Terry Brigge, TATL, Region III

FROM: Mark Tucker, TAT Region III MT

SUBJECT: Valmont Site: Soil Gas and Groundwater Investigations

DATE: October 28, 1987

Preliminary soil gas and groundwater investigations were conducted by the Roy F. Weston Technical Assistance Team (TAT) at the Valmont Site in Hazelton, Pennsylvania on October 22 through October 27, 1987. The information gathered during these investigations indicates that the source of the contamination affecting the residential wells is located in the Valmont Industrial Park southwest of Bent Pine Road. Chromatex, Inc. is the only potential responsible party identified to date.

METHODS OF INVESTIGATION

The soil gas surveys were conducted using the "ERT Method". At each soil gas sampling station, a one half inch diameter hole was created to a depth of three to five feet using a slambar. A stainless steel tube was inserted into the hole to act as a sampling probe. Soil gas samples were collected at each station into one liter Tedlar bags using a vacuum desicator device. The gases were analyzed in a nearby field laboratory using a portable gas chromatography instrument (Photovac) operated by a TAT chemist.

The groundwater investigation consisted of the accurate surveying of all accessible residential well heads using an infrared theodolite. Surveying was conducted by George Prince of EPA's Environmental Response Team. Static water levels were also measured at all residential wells which were accessible. A groundwater contamination map was produced using concentrations provided through sampling and analysis by the Pennsylvania Department of Environmental Resources.

The underground storage tank located at the northwest corner of the Chromatex facility was sampled on October 26, 1987. Sampling consisted of a headspace gas sample collected into a Tedlar bag, and a liquid sample from the top of the tank (reported capacity: 10,000 gallons). The headspace sample was analyzed in the field using the Photovac. The liquid sample is to be shipped to a commercial laboratory for analysis.

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SOIL GAS RESULTS

The soil gas data is shown in the attached Map 1. Trichloroethylene (TCE) was detected on all sides of the Chromatex facility. Pockets of high TCE concentration were found near the southwest corner of the facility, behind the facility to the southeast, and in a broad area on the northeast side of the facility near the affected residential wells. High concentrations of TCE (2.2 ppm) were found within 200 feet of the most severely contaminated residential well.

The soil gas data indicated that TCE in soil gas does not extend far off the southwest corner of the facility, and also does not extend far to the south or southeast behind the facility. The soil gas data does indicate, however, that TCE extends in a broad front from the facility in a northeast direction towards the affected residential wells.

UNDERGROUND STORAGE TANK

Headspace analysis of the underground storage tank at the northwest corner of the facility yielded a TCE concentration of 1100 ppm. The liquid in the tank is a pale blue, milky, and watery substance. At the time of sampling, the tank was filled to within one foot of its top.

RESIDENTIAL WELL CONTAMINATION

A concentration contour map for the residential wells is shown in the attached Map 2. The map indicated the presence of a long, linear contaminant plume extending from the Chromatex facility in a northeast direction through the residential area. The highest residential well contamination is found in the homes nearest to the Chromatex facility. Contaminant concentrations decrease at farther distances from the facility.

GROUNDWATER LEVEL INVESTIGATION

Groundwater was found to occur at a depth of twenty to thirty feet beneath the surface in all residential wells. Water level measurements were combined with the surveyed well head elevations to provide the elevation of the water in each well. These water level elevations were used to produce the water level contour map in the attached Map 3.

The water level contour map indicates that groundwater flow is in a northeast direction (flow occurrs perpendicular to contour lines). The groundwater flow direction of Map 3 coincides with the long dimension of the contaminant plume shown in Map 2.

Water level measurements deviating from the contours of Map 3 are present. These deviations are probable due to recent pumping of the wells and/or varying depths of the wells intersecting water zones of different hydraulic pressure. Map 3 does, however, give a good general direction of groundwater flow.

GEOLOGIC CONSIDERATIONS

The Chromatex facility is situated on the top of a knoll which forms a surface water divide. Surface water on the southwest side of the facility flows to the southwest, and surface water on the northeast side of the facility flows to the northeast. Groundwater flow often mimics surface topography. If this is the case at this site, the Chromatex facility is located on a groundwater divide.

The Valmont Site is underlain by folded beds of conglomerate, sandstone, and shale of the Pottsville Formation. Bedding measurements of nearby outcrops indicate that these beds strike 40°-50° to the northeast and dip to the northwest at 15°-25°. The strike of the beds coincides with the direction of groundwater flow and also the long direction of the contaminant plume. The geologic information indicates that groundwater flow is controlled by the regional strike, either by bedding or by fractures oriented in that direction.

SUMMARY OF FINDINGS

1. TCE is found in soil gas at high concentrations in the near vicinity of the Chromatex facility.

2. Soil gas TCE contamination extends in a northeast direction towards the affected residential wells.

3. The underground storage tank contains high levels of TCE.

4. Residential well contamination concentrations are highest near the Chromatex facility and decrease at farther distances from the facility.

5. Groundwater level measurements indicate that groundwater flows in a northeast direction from the Chromatex facility through the residential area.

6. Groundwater flow at the site is controlled by the regional strike.

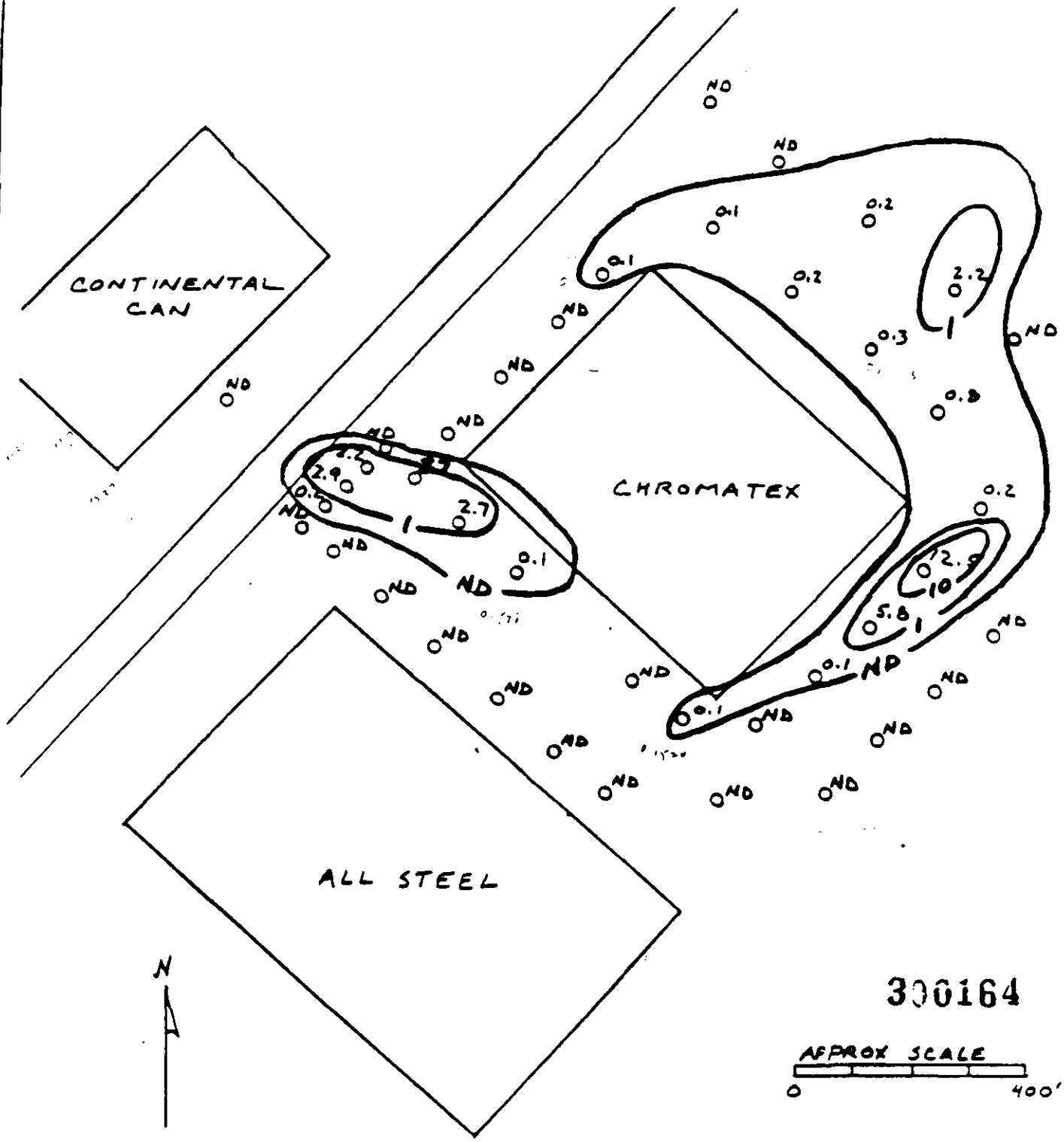
MT/djt

Attachments: Map 1 - Soil Gas Survey
Map 2 - Contaminant Concentration Map
Map 3 - Groundwater Level Map

ORIGINAL (Red)

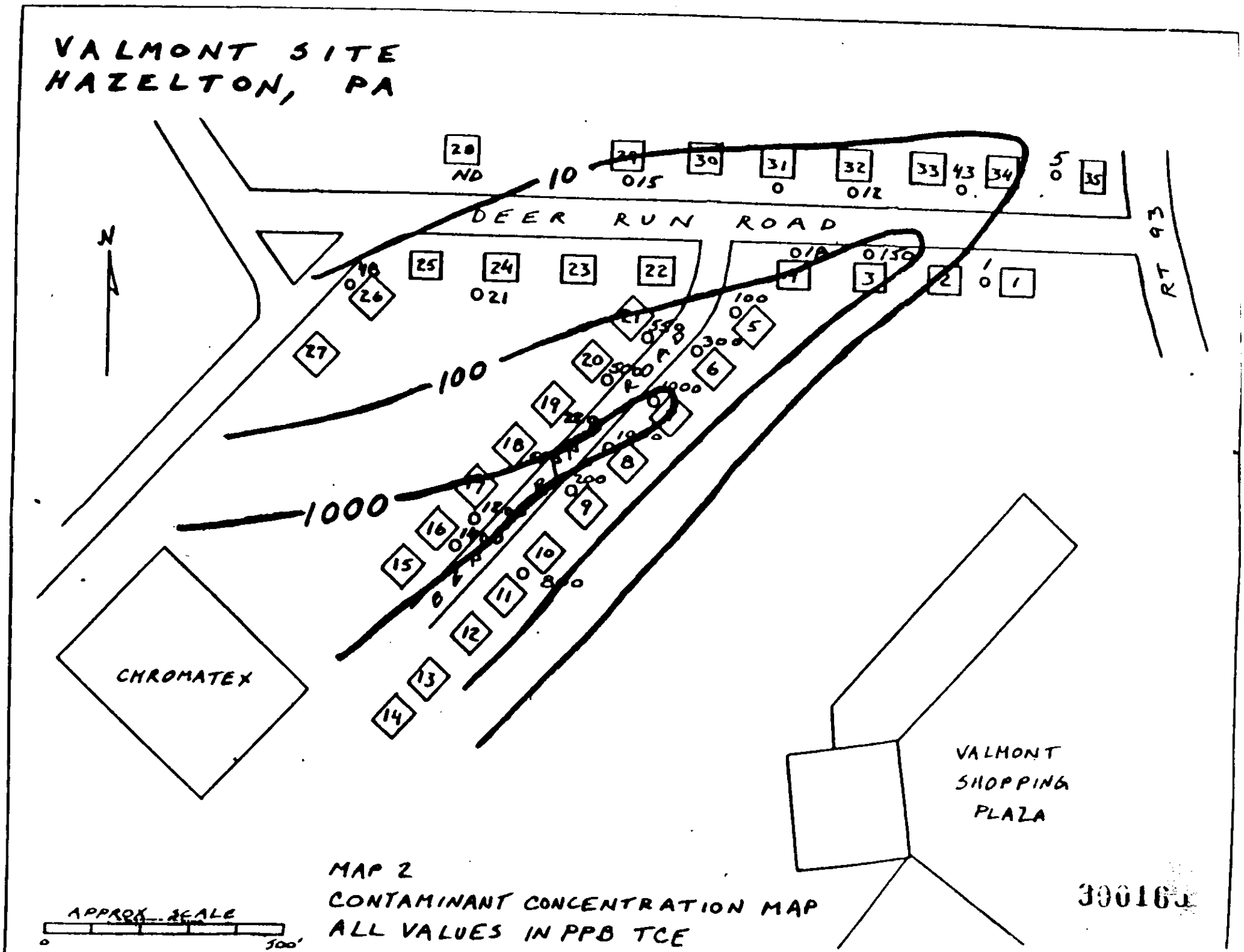
MAP 1
SOIL GAS SURVEY
TCE IN PPM

VALMONT SITE
HAZELTON, PA

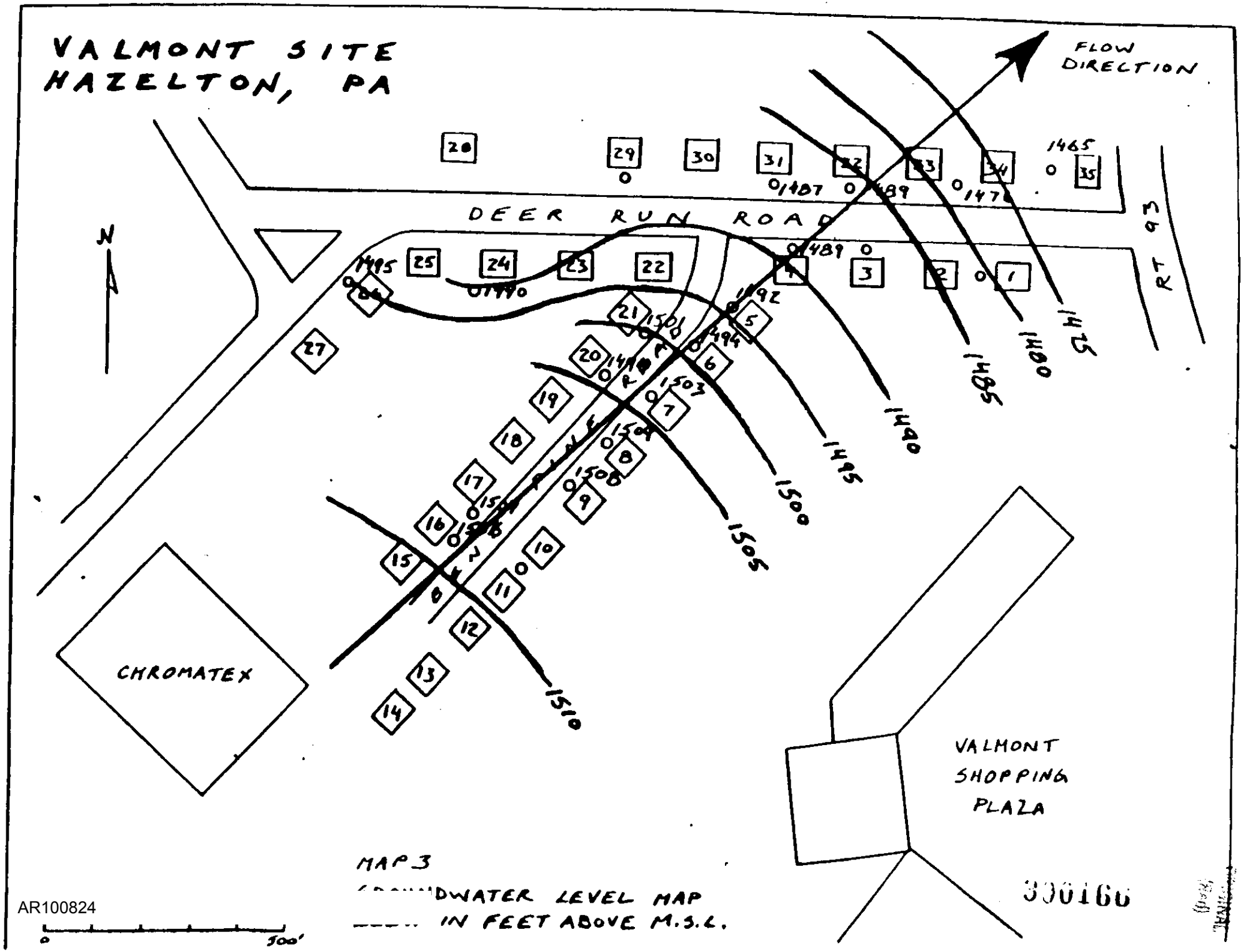


300164

M. TUCKER/WESTON TAT



MAP 2
CONTAMINANT CONCENTRATION MAP
ALL VALUES IN PPB TCE



APPENDIX B

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Drive, Suite 110
Houston, Texas 77092, (713) 690-4444, FAX (713) 690-5646

ANALYSIS REPORT

ERM, Inc.
855 Springdale Drive
Exton, PA 19341-

Attn: Jim LaRegina
Project: Continental White

Matrix: SO
Sample ID: 21387

GSAI Sample: 3472
GSAI Group: 507
Date Reported: 08/09/89
Discard Date: 09/08/89
Date Submitted: 08/04/89
Collected by: GFM
Purchase Order:
Sales Order: 00402
Project No.: 336020201

Test	Analysis	Result as Received	Units	Limit of Quantitatic
7	PP Volatiles, Solids			
	Acrolein	ND	ug/kg	50
	Acrylonitrile	ND	ug/kg	30
	Benzene	ND	ug/kg	5
	Bromoform	ND	ug/kg	5
	Bromomethane	ND	ug/kg	5
	Carbon tetrachloride	ND	ug/kg	5
	Chlorobenzene	ND	ug/kg	5
	Chlorodibromomethane	ND	ug/kg	5
	Chloroethane	ND	ug/kg	10
	Chloroform	ND	ug/kg	5
	Chloromethane	ND	ug/kg	5
	2-Chloroethylvinyl ether	ND	ug/kg	5
	Dichlorobromomethane	ND	ug/kg	5
	1,1-Dichloroethane	ND	ug/kg	5
	1,2-Dichloroethane	ND	ug/kg	5
	1,1-Dichloroethylene	ND	ug/kg	5
	1,2-Dichloropropane	ND	ug/kg	5
	1,2-Dichloropropylene	ND	ug/kg	5
	Ethylbenzene	ND	ug/kg	5
	Methylene chloride	ND	ug/kg	5
	1,1,2,2-Tetrachloroethane	ND	ug/kg	5
	Tetrachloroethylene	ND	ug/kg	5
	Toluene	ND	ug/kg	5
	trans-1,2-Dichloroethylene	ND	ug/kg	5
	1,1,1-Trichloroethane	ND	ug/kg	5
	1,1,2-Trichloroethane	ND	ug/kg	5
	Trichloroethylene	ND	ug/kg	5
	Vinyl chloride	ND	ug/kg	10
	Xylenes (Total)	ND	ug/kg	5

Respectfully Submitted,
Gulf States Analytical, Inc.
Reviewed and Approved by:

Kathleen Eaves
Kathleen Eaves
Project Manager

GULF STATES ANALYTICAL, INC.
5450 Northwest Central Drive, Suite 110
Houston, Texas 77092, (713) 690-4444, FAX (713) 690-5646

ANALYSIS REPORT

ERM, Inc.
855 Springdale Drive
Exton, PA 19341-.

Attn: Jim LaRegina
Project: Continental White

Matrix: SO
Sample ID: 21388

GSAI Sample: 3473
GSAI Group: 507
Date Reported: 08/09/89
Discard Date: 09/08/89
Date Submitted: 08/04/89
Collected by: GFM
Purchase Order:
Sales Order: 00402
Project No.: 336020201

Test	Analysis	Result as Received	Units	Limit of Quantitati
.77	PP Volatiles, Solids			
	Acrolein	ND	ug/kg	50
	Acrylonitrile	ND	ug/kg	30
	Benzene	ND	ug/kg	5
	Bromoform	ND	ug/kg	5
	Bromomethane	ND	ug/kg	5
	Carbon tetrachloride	ND	ug/kg	5
	Chlorobenzene	ND	ug/kg	5
	Chlorodibromomethane	ND	ug/kg	5
	Chloroethane	ND	ug/kg	10
	Chloroform	ND	ug/kg	5
	Chloromethane	ND	ug/kg	5
	2-Chloroethylvinyl ether	ND	ug/kg	5
	Dichlorobromomethane	ND	ug/kg	5
	1,1-Dichloroethane	ND	ug/kg	5
	1,2-Dichloroethane	ND	ug/kg	5
	1,1-Dichloroethylene	ND	ug/kg	5
	1,2-Dichloropropane	ND	ug/kg	5
	1,2-Dichloropropylene	ND	ug/kg	5
	Ethylbenzene	ND	ug/kg	5
	Methylene chloride	ND	ug/kg	5
	1,1,2,2-Tetrachloroethane	ND	ug/kg	5
	Tetrachloroethylene	ND	ug/kg	5
	Toluene	ND	ug/kg	5
	trans-1,2-Dichloroethylene	ND	ug/kg	5
	1,1,1-Trichloroethane	ND	ug/kg	5
	1,1,2-Trichloroethane	ND	ug/kg	5
	Trichloroethylene	ND	ug/kg	5
	Vinyl chloride	ND	ug/kg	10
	Xylenes (Total)	ND	ug/kg	5

Respectfully Submitted,
Gulf States Analytical, Inc.
Reviewed and Approved by:

Kathleen Eaves
Kathleen Eaves
Project Manager

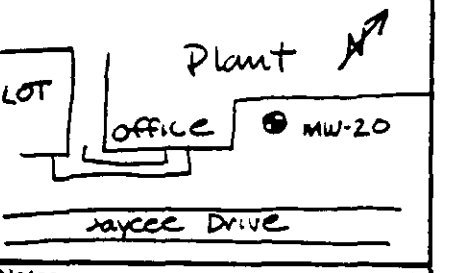
APPENDIX C

Environmental Resources Management

Drilling Log

Project: Continental White Cap Owner: Pepper Hamilton & Scheetz
Location: W. Hazleton PA W.O. Number: 336-02
Well Number: MW-20 Total Depth: 55 ft Diameter: 6"
Surface Elevation: — Water Level: Initial: — 24-hrs: —
Screen: Dia. NA Length: NA Slot Size: NA
Casing: Dia. 6" Length: 19 ft Type: Steel
Drilling Company: Stackhouse & Son Drilling Method: Air Hammer
Driller: Dave Stackhouse Log By: Jim LaRegina Date Drilled: 7 July 89

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				0-6' Grey medium sandstone, weathered
				6-7' Yellow/Orange Sandstone, weathered
10				7-12.5' Grey sandstone, iron stained weathered joints
				12.5-19' Grey to black, medium sandstone, trace mica. Top of bedrock @ 19'
20				19-22' Same as above
30				22-26' Brown arkosic sandstone with angular quartz fragments, iron stained. weathered, moist.
40				26-33' Dark grey, coarse sandstone, trace mica
50				33-41.5 Dark grey to black, coarse sandstone with trace of coal
60				41.5-46 Dark grey to black conglomeratic sandstone.

Environmental Resources Management

Drilling Log

Project: Continental White Cap Owner: Pepper Hamilton + Scheetz

Location: W. Hazleton PA W.O. Number: 336-02

Well Number: MW-20 Total Depth: 55 ft Diameter: 6"

Surface Elevation: — Water Level: Initial: — 24-hrs: —

Screen: Dia.: NA Length: NA Slot Size: NA

Casing: Dia.: 6" Length: 19 ft Type: Steel

Drilling Company: Stackhouse + Son Drilling Method: Air Hammer

Driller: Dave Stackhouse Log By: Jim LaRegina Date Drilled: 17 July 89

Sketch Map

Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				46-48' Grey sandstone weathered dark brown with iron staining. Moist.
				48-55' Dark grey medium sandstone
				well Construction
				0-19' 8 3/4" bore hole
				0-19' 6" steel casing tremie grouted in place with cement/bentonite mix. Well completed with locking flush mount cap.
				19-55' 6" open borehole
				1250 hrs · Well completed
				1348 hrs SWL 55' BLS
				1600 hrs SWL 48' BLS
				estimated yield < 1 gpm

AR100830

APPENDIX B

GROUNDWATER TECHNOLOGY, INC.

Chadds Ford West, Rt. 1, Chadds Ford, PA 19317 (215) 388-[illegible]
Fax (215) 388-[illegible]

Report of Findings

for
Investigative Activity
at the
Continental White Cap
facility
Hazleton, Pennsylvania

Prepared for:

Continental White Cap
Valmont Industrial Park
Hazleton, Pa.

Prepared by:

Groundwater Technology, Inc.
486 South Mountain Blvd.
Mountain Top, Pa.

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1. INTRODUCTION

The Continental White Cap facility is located in the Valmont Industrial Park, Luzerne County, Hazleton, Pennsylvania (see Figure 1). The plant is a manufacturing facility which produces various sized metal closures (caps) for glass containers, which are used in the food industry. In that manufacturing process, industrial solvents are stored in underground tanks adjacent to the building.

During tightness testing of the underground solvent storage tanks at this facility, Continental White Cap discovered that one of the tanks did not pass the test and leaked during testing. As a result, Continental White Cap contracted the services of Groundwater Technology, Inc. (GTI) to assess the environmental impact of this situation and propose a program to address the recovery of observed forms of solvent present in soil and groundwater.

During the preliminary investigations conducted at the Continental White Cap facility, the presence of volatile organics was reported to occur in soil and groundwater. The following sections outline the data collected and the recommendations based on these data.

2. BACKGROUND

Groundwater Technology, Inc. (GTI) has been retained by Continental White Cap (CWC) to provide technical and consulting services to investigate an inadvertent subsurface solvent loss at their facility in Hazleton, Pa. The loss was discovered when one of the tanks failed a tightness test during routine integrity testing of the facility's underground solvent storage vessels. It is estimated that 50 to 100 gallons of solvent were lost before the tank could be partially drained to prevent further loss. The product lost from this tank was a blend of 70% xylenes, 15% cyclohexanone, and 15% diacetone alcohol. It should be noted that the 70% xylenes component of the solvent mixture is actually a blend with 47.1% m-xylene, 22.0% p-xylene, 17.5% o-xylene, 12.6% ethyl benzene, and 0.8% toluene. As a responsible corporate citizen, Continental White Cap immediately notified the proper regulatory authorities (PADER and EPA) and has now contracted GTI to assess and solve their environmental concerns.

As part of GTI's comprehensive approach to site remediation, and as part of CWC's program to upgrade this facility, a new storage facility has been installed at this site. This upgraded storage facility included 5 new double-walled, cathodically protected steel underground tanks placed in a new tank pit with a tertiary containment system (tank pit liner).

Prior to the tank replacement project, GTI was involved in assessing the impact of the fugitive product. This involved the installation of six observation wells, a soil gas survey and a review of historical data. Based on the data provided by these worksteps, GTI initiated the following workplan:

- Install additional wells outside,
- install wells inside the CWC facility,

- sample all wells
- assess soils contamination in the area around the former "waste tank", and
- assess aquifer characteristics.

The following section describes the methods used in this assessment, and the information provided.

3. FIELD ACTIVITIES

3.1 Installation of Wells (outside)

3.1.1 Methodology

On 30 May 1989, four (4) additional wells (OW-7, 8, 9 and 10) were drilled as depicted on Figure 2. The wells were drilled using an Ingersol-Rand TR-4 air rotary drill rig to a depth of 40 feet; 4-inch P.V.C. well screen (0.020-inch slot) was placed from 10 feet below grade to the bottom of the well, and 4-inch P.V.C. casing was installed from the surface to 10 feet. The annular space was filled with #2 morie sand for the complete screened interval, and a bentonite seal was placed above this. Each well head is secured with a locking step-down cap under a 12-inch manhole which is grouted to the surface and down to the top of the bentonite seal. Figure 3 illustrates the typical well construction for these wells. Actual geologic logs and construction details are listed on the drill logs in Appendix I.

On September 13, 1989 the wells were surveyed for elevational and horizontal control. This information was compiled along with the existing elevational data to generate a liquid level data collection sheet (see Appendix II). Subsequently, observations were made of the water table elevations and a water table gradient map has been compiled.

3.1.2 Summary of Findings

The information obtained during the installation of these observation wells was interpreted to characterize the subsurface material encountered at the facility. A description of the

geology is described in the observation well logs depicted in Appendix I.

In general, the subsurface material at the property consists of miscellaneous occurrences of fill material sporadically overlying weathered clays and sands of the Pennsylvanian Age Pottsville Group. The weathered material rests on top of competent bedrock at depths below grade varying from four to thirteen feet across the property. The competent bedrock consists of fine to coarse grained sandstones interbedded with shale, siltstone and occasional beds of carboniferous material.

3.2 Installation of Well (inside)

3.2.1 Methodology

During July 1989 several attempts were initiated to install the proposed wells inside the plant building. A portable Mobile Minute-Man drill rig was used at these first attempts. The actual drilling activity tool place on weekends due to the possible necessity to shut-down the manufacturing plant had drilling been scheduled during regular work hours. These attempts met with limited success; refusal (the inability to drill any deeper) was met at approximately 16 feet below grade.

On 22 July 1989, a portable hollow-stem auger/diamond bit drill rig was brought to this facility to install a well inside the plant. The hole was drilled to a depth of 29 feet, and finished as a 2-inch observation well (#11). Drill cuttings were monitored with a photo-ionization device and the results are listed on the drill log in Appendix I. The well head was finished under a flush mount 9-inch manhole, which is fixed in place with concrete. See Figure 2 for location of observation wells.

3.2.2 Summary of Findings

The data provided by this drilling activity confirm the results of previous drilling. Bedrock was encountered at approximately 11 feet below grade and consisted of a well cemented sandstone and shale of the Pennsylvanian age Pottsville Group.

During drilling operations, a diamond studded coring bit utilizing hollow drill collars was used to extract a core of the competent basement rock formation. Inspection of the core indicated the presence of some minor vertical fracturing within the sandstone. Additionally, the sandstone contained thin beds of shale which exhibited deterioration along the bedding planes. Excluding the above mentioned observations, the rock was very competent, varying in color and grain size throughout the vertical profile.

The cuttings from this drilling operation exhibited considerable contamination based on the photoionization device readings. Groundwater samples were collected from this point which quantify the contamination in the groundwater at this well. Section 3.3 outlines the methods and findings of the groundwater sampling event.

In addition to revealing the geologic matrix at this site, observation wells provide access to the water table aquifer for liquid level measurements and groundwater sampling. Liquid levels were observed on 29 August and 20 September 1989 (see Appendix II). Observation well 11 needed to be developed to remove the formation fines, "mud", which was observed on 29 August. Immediately after the development process, free product was observed on this well, however during the observation of liquid levels on 20 September, no free product was measured.

Similarly, free product was observed in well #2 on 20 September, however, on 29 August this well had no free product. Apparently, the presence of phase separated product is variable, and possible related to water table fluctuations. A consistent program of liquid level observations would confirm or deny these findings.

Figures 4 and 5 have been drawn from the liquid levels observed on 29 August and 20 September respectively. Both water table gradient maps indicate a crest or mound on the water table in the vicinity of well #3, which slopes off to the north , west and south.

3.3 Groundwater Sampling

3.3.1 Methodology

On 11 September 1989, each well was purged to remove the standing water in the well, and to facilitate the collection of representative groundwater samples. After having removed three well volumes from each well using a submersible pump, the representative groundwater samples were collected in a bottom loading teflon surface sampler, and placed in 40 ml teflon-septum vials (VOA bottles). The samples were acidified with hydrochloric acid to a pH of 2, and were placed on ice to maintain a temperature of 4° centigrade. A chain of custody form was initiated for these samples which accompanied the samples throughout the shipping and analytical processes. The chain of custody is attached to the individual laboratory analyses in Appendix III.

The submersible pump was decontaminated between each well and the surface sampler was also decontaminated with a triple rinse between each sample collection. Each sample was analyzed for volatile organic compounds by purge and trap gas

chromatography/mass spectrophotometry (EPA Method 624). The laboratory results are included under Appendix III.

3.3.2 Summary of Findings

The laboratory analyses provide a means of identifying the areal extent of the dissolved plume as defined by the present observation wells. The total concentration of volatile organics which were reported by the laboratory have been totalized and these figure have been used to draft a map of the dissolved plume. Figure 6 illustrates the concentrations of total volatile organic compounds (VOC) as reported in the laboratory analyses. This figure indicates two areas of significant groundwater contamination (> 100 parts per million). These two areas are partially defined as the area around wells 2 and 11, and wells 7 and 8. It is unlikely that these two areas are in communication since wells 1 and 3 are immediately between the two areas and have less than half of the total concentrations. The installation of additional wells would likely help in defining the possible source area and also the extent of this contamination (see Section 4).

3.4 Assessing Soil Contamination

3.4.1 Methodology

In assessing the soil contamination at this facility, a sampling program was established around the previous product storage areas. Particularly, samples were collected from the area where the waste solvent line was removed. Figure 7 indicates the locations of these samples, and the actual analyses are included under Appendix IV.

Samples were collected on 25 May 1989 in accordance with

ASTM D420-87. This sampling plan was requested by the PA DER in order to evaluate the soil conditions around the waste solvent line. Samples were collected from a depth of approximately 18", which is the approximate depth of the previous trench. The samples were collected into 500 ml amber jars with teflon-lined lids, placed on ice, and shipped via overnight courier to the analytical laboratory. Chain-of-custody forms were initiated, which accompanied the samples throughout the shipping and analytical processes. Each sample was analyzed for volatile organic constituents and EPA priority pollutant metals; samples 1 and 4 were analyzed for EP TOX metals, and samples 3 and 6 were analyzed for pH.

It should be noted that samples were collected from these same points on February 15, 1989 using the same methods of collection and analysis. The laboratory results for this sampling event are also included under Appendix IV.

3.4.2 Summary of Findings

The laboratory analytical results of the more recent sampling event for volatile organics indicate detectable levels of 2-Butanone (Methyl Ethyl Ketone), and Acetone. However, these levels were derived from the actual analytical values, whereby a blank sample was analyzed and found to contain the same constituents. In cases such as this, it is common practice to subtract out the levels found in the blank sample and report the remaining quantity. This raises certain questions as to the origin of these compounds and the concentrations reported. To further document the nature of these soils, it is recommended that additional samples be collected and possibly split between two laboratories as a quality control measure (see Section 4).

Of specific concern for these analyses is the sample #6,

which was to be considered a "background" sample for control. Sample #6 was collected from the grassy slope, approximately 25 feet west of well #7. Although it was not expected that this sample would show any VOC contamination, there were detectable levels of both acetone and methyl ethyl ketone. A confirmatory sampling event is also suggested to verify these results.

The priority pollutant metals analysis reveal levels of metals which are considered within the normal range for northeastern soils (see references, Section 6, US EPA). The EP TOX metals analysis was conducted to determine leachable metals, and whether to classify these soils as hazardous. The laboratory analyses reveal that these soils (samples 1 and 4) are not hazardous based on the metal content; and the priority pollutant metals analyses indicate that it is unlikely that the other samples would have leachable metals of concern.

Previous laboratory analyses indicate the presence of other volatile organic compounds, which were not detected in this sampling event. Particularly toluene, xylenes, and ethyl benzene were detected in samples collected on February 15, 1989 (see Appendix IV). The absence of these compounds in the more recent sampling event indicate that volatilization has likely occurred.

3.5 Assessing Aquifer Characteristics

3.5.1 Methodology

On August 28, 1989 a long-term pump test was initiated with the intent to continue pumping for 72 hours. A water table depression pump was placed in observation well OW-3, and continuous data logging instrumentation was placed in surrounding observation wells and the pumping well. The pump test was initiated, however due to insufficient quantities of water, the

pump test was terminated shortly thereafter (approximately 2 hours). In lieu of the long-term pump test, slug tests were performed.

On September 20 and 21, 1989 slug tests were preformed in observation wells OW-4, OW-6, OW-8 and OW-20 in order the estimate the hydraulic characteristics of the formation. The slug tests performed involved the rapid introduction of a known volume of distilled water into each well to raise the level of water above that measured at static conditions. Following introduction of the slug, the rate at which the water level returned to static conditions was observed by measuring the drop in water level in each well at pre-determined time intervals, and recording the time relative to the introduction of the slug.

Slug test data was recorded using an electronic data logger equipped with a pressure transducer. As the initial control point, the static water level was measured and recorded for each well prior to the initiation of the tests. The transducers electronically measured the change in head in each well every fifteen seconds for the first ten minutes, every one minute for the next one hundred twenty minutes, and every five minutes to the conclusion of the slug tests. The data stored in the digital logger was printed on paper with a portable field printer.

The information provided by the slug tests performed on observation wells OW-4, OW-6, OW-8, and OW-20 was then reduced to estimate the hydraulic characteristics of the water bearing formation. A discussion of the interpretation of the slug test data is presented in Section 3.5.2 below. The slug test data, including graphical reduction of the results is presented in Appendix V.

3.5.2 Summary of Findings

Groundwater elevational measurements were taken from the observation wells on various occasions; this is to determine and confirm the direction of groundwater flow across the property. Groundwater elevational data is included in Appendix II. These data include depth to water, elevation datum for each observation well, as well as water level elevations relative to sea level. Groundwater elevational contour maps depicting the water table gradient of the water table aquifer are included as figures 4 and 5.

The observation well elevational data indicates there is considerable variability in the groundwater flow direction across the property. Groundwater flow across the eastern geographical portion of the property trends southwest to northeast under an estimated hydraulic gradient of 0.018 feet per feet. Groundwater flow across the western geographical portion of the property trends east to west under an estimated hydraulic gradient of 0.10 feet per feet. The hydraulic divide appears to be oriented northwest to southeast with its axis cutting through the former underground storage tank area. The estimated orientation of the groundwater divide is depicted on figure 4. Groundwater flow east of the divide appears trend northeast; groundwater flow west of the divide appears to trend west.

The hydraulic characteristics of the water bearing formation at Continental White Cap were evaluated based upon the results of the slug tests performed in observation wells OW-4, OW-6, OW-8 and OW-20. The reduction of the slug test data is presented in Appendix V.

The data compiled during the slug tests was reduced and analyzed using the methods of Hvorslev (1951) and Cooper, et at.

(1967). Using these methods, the properties which describe the ability of the aquifer to transmit and yield water were estimated. Hydraulic conductivity (K) is a constant of proportionality describing the rate at which water can move through a porous medium. Transmissivity (T) can be described as the rate at which water can move through a unit width of aquifer or confirming bed under a unit hydraulic gradient. In general, hydraulic conductivity varies with particle size for unconsolidated porous media; silty or clayey materials exhibit low values of hydraulic conducting, whereas sands and gravels exhibit higher values. Transmisivity varies with the saturated thickness of the aquifer, exhibiting low values for thin zones of saturated thickness and higher values for thicker zones. The estimated values of hydraulic conductivity and transmisivity for Continental White Cap are listed below according to well location.

Observation Well #	Hydraulic Conductivity gal/day/ft^2	Transmisivity gal/day/ft^2
OW-4	0.013	0.259
OW-6	0.726	33.84
OW-8	0.623	31.40
OW-20	0.279	10.64

The hydraulic parameters estimated for the aquifer indicate there is considerable variability in the ability of the aquifer to transmit water within different geographical portions of the property. In order to explain this difference, one must look to the observation well descriptive logs presented in Appendix I. Based upon the lithological descriptions presented in that section, it is evident that observation wells OW-6, OW-8 and OW-20 exhibit a coarse grained texture while observation well OW-4 exhibits a fine grained texture. Correlating this information with published data concerning the permeability of such material, it is clear the K values reported for wells OW-4, OW-6, OW-8, and OW-20 are consistent with expected values listed in the

literature (Groundwater Manual, U.S. Department of the Interior, page 29.)

The saturated thickness (b) of the water bearing formation at the location of the observation wells can also be estimated using the values of T and K from the slug test data. This is accomplished through the following relationship:

$$T = K \times b$$

The calculated values are estimated below according to well location:

Observation Well #	Saturated thickness of aquifer in feet.
OW-4	19.90
OW-6	46.60
OW-8	50.40
OW-20	38.10

These calculated values indicate the apparent saturated thickness of the aquifer is greatest on the western portion of the facility where the T values are the greatest. The saturated thickness estimated for well OW-4 correlates with the predicted groundwater divide possibly associated with the thinning of the water bearing formation in the vicinity of this well. Therefore, the calculated values of the apparent saturated thickness of the aquifer at these locations are considered good approximations for the thickness of the aquifer material in the immediate vicinity of the observation wells.

The storativity of an aquifer can be defined as the volume of water an aquifer releases from storage due to a decline in head. Generally, these values are high for water table aquifer conditions and low for semi-confined and confined aquifer

conditions. The estimated values of storativity are listed below according to well locations:

Observation well #	Storativity (unitless)
OW-4	1.42×10^{-5}
OW-6	1.08×10^{-5}
OW-8	8.5×10^{-5}
OW-20	1.08×10^{-5}

Based upon these storativity values, it is fair to assume that the aquifer exhibits semi-confined to confirmed conditions. It should be noted that storativity values derived by the Cooper method can only be considered gross approximations for this hydraulic parameter. Better approximations are estimated utilizing information derived from a long term pump test.

The average groundwater seepage velocity can be calculated for each well based upon the hydraulic parameters estimated from the slug test data. Specifically, the hydraulic conductivity can be used to calculate the average seepage velocity (Vs), based upon the following relationship:

$$Vs = Ki/n$$

where (i) is the calculated hydraulic gradient, and (n) is the effective porosity estimated for each well bore.

The hydraulic conductivity was estimated from the slug tests, the hydraulic gradient was estimated from the groundwater contour maps, and the porosity was estimated based upon the geologic description presented in the drill logs in Appendix I. Based upon these estimated values, the average seepage velocity for each well bore was estimated according to each well location;

Observation Well #	Groundwater Seepage Velocity (Vs) estimated range					
	ft/day			ft/year		
OW-4	$1x10^{-4}$	to	$6.3x10^{-4}$	0.038	to	0.23
OW-6	$3.3x10^{-2}$	to	$1.9x10^{-1}$	11.89	to	71.2
OW-8	$5.4x10^{-3}$	to	$3.2x10^{-2}$	1.97	to	11.68
OW-20	$2.4x10^{-3}$	to	$1.4x10^{-2}$	0.88	to	5.11

The groundwater seepage velocity calculations are included in Appendix V.

Based upon the calculated groundwater seepage velocities, it is apparent that the estimated flow velocities vary considerably across the property. For clarity, groundwater velocity calculations are subdivided into three hydraulic zones which include characteristics of the aquifer east of the divide (observation well OW-20), west of the divide (observation wells OW-6 and OW-8) and within the divide itself (observation well OW-4). Groundwater flow velocity values calculated for well OW-20 located east of the divide indicate an estimated range from 0.88 to 5.1 feet per year. Groundwater flow velocity values calculated for observation wells OW-6 and OW-8 located west of the divide indicate an estimated range from 1.97 to 71.2 feet per year. Groundwater flow velocity within the groundwater divide, as indicated by observation well OW-4, is extremely low and practically negligable. Groundwater flow in this immediate area is on the order of 10's of feet per 100 years. This data is extremely important as it confirms the existence of a groundwater divide at the facility. Overall, the possible values of groundwater flow velocity at the property range from .0038 to 71.2 feet per year with the lowest values associated with the groundwater divide area.

It should be noted that the hydraulic parameters estimated at the property are provided from slug tests whose duration is

very short. Subsequently, of the hydraulic parameters estimated, only the hydraulic conductivity values calculated for each well can be reported as absolute vales representative of the water bearing material close to the well. The calculated values of other aquifer parameters derived from the slug test data include intuitive interpretations of site specific hydrogeologic conditions to determine the accuracy of the values reported. Therefore, these values should be considered with subjectivity. Additionally, the introduction of a slug into an observation well only estimates the water bearing characteristics of the material close to the well bore. Therefore, an assumption should not be made that the hydraulic parameters reported are representative of the aquifer conditions as a whole.

4. CONCLUSIONS AND RECOMMENDATIONS

The data provided by this investigation predicate the following conclusions:

- Organic compounds are present in an adsorbed phase on the geologic matrix.
- Organic compounds are present in a dissolved phase in the water table aquifer at concentrations ranging from 89 parts per billion (ppb) to 153,600 ppb.
- Phase separated (free product) organics are present at times in some of the groundwater observation wells.
- The water table gradient is highly variable across the site with general conditions sloping away from OW-3 in northerly, westerly and southerly directions.
- Aquifer characteristics (in the shallow water table) indicate minor amounts of water would be available for pumping.

4.1 Technologies Considered

Based on the data provided by this and previous investigations, Groundwater Technology, Inc. has evaluated the following technologies in order to address the contamination at this facility;

4.1.1 Soil Venting Technology

This technology utilizes vapor extraction points which penetrate the vadose zone and facilitate the withdrawal of gaseous vapors out of the subsurface matrix. A pump which creates a high vacuum is used to draw the vapors out of the ground; some form of treatment would likely be required for the air discharge.

4.1.2 Dissolved Groundwater Containment

Through the use of strategically placed recovery wells, groundwater control can be maintained to prevent further migration of the dissolved contaminants. Although the outer fringes of the dissolved plume have not been defined by the

present observation well network, initiating water table depression and groundwater control in the plume core area will help to mitigate the continuing source of dissolved contaminants.

4.1.3 Treatment of Dissolved Contaminants

4.1.3.1 Air Stripping Technology

This technology utilizes a tall (approximately 15') tube which is packed with a plastic material with a high degree of surface area to provide maximum air to water contact. Contaminated water is pumped to the top of the air stripper and is directed downward through a spray nozzle which atomizes the flow. Air is pumped from the bottom of the air stripper and is directed upward against the downward flow of water. This counter-current water/air flow transfers the contaminants from a dissolved state into the air stream. Treatment of the air discharge would likely be required for this application.

4.1.3.2 Activated Carbon

This process utilizes activated carbon contained in a vessel (usually a 55 gallon drum), which removes the volatile contaminants from a waste stream, liquid or gaseous. The absorptive capacity of the carbon is a finite quantity, which can be calculated and replaced accordingly. The spent carbon may sometimes pose a concern in regards to its disposal. Some carbon generators may accept the spent carbon for regeneration, but only in large (20001b) quantities.

4.1.3.3 Above-ground Biological Reduction

Through the use of an above ground bio-reactor, hydrocarbon contaminants can be effectively reduced to carbon dioxide (CO^2) and water. Living conditions are enhanced to provide indigenous bacteria with all the nutrients (oxygen, nitrogen and phosphorus) needed for complete reduction from contaminant to CO^2 and water. The bacteria thrive on any carbon source (contaminant), however the typical environment is nutrient deficient (usually oxygen deficient), and as such, the bacterial numbers are limited. By adding these nutrients at optimal concentrations, bacterial activity is enhanced and controlled.

4.1.4 Further Definition of Plume Fringe

The dissolved contaminants in the water table aquifer are not completely defined as to their horizontal extent. Through the installation of additional observation wells and subsequent sampling, plume dimensions can be further assessed. This is critical in determining the full impact of the contamination.

4.1.5 Treatment of Air Discharge

For the treatment of any air stream which contains the known contaminants at this facility, the use of the existing catalytic incinerator at the Hazleton facility would be considered. It is highly probable that this unit could be modified slightly to receive the air discharge from either the soil venting system or an air stripper, if either of these technologies are used.

4.2 Recommended Workscope

After evaluating these options, GTI proposes the following workscope for this facility.

- Conduct a confirmatory soil sampling event at the same locations as sampled previosly (see figure 7) in order to confirm or deny the VOC concentrations reported.
- Conduct a vapor extraction pump test to specify extraction removal rates, soil gas contaminant loads, discharge characteristics and optimal spacing for vapor extraction points.
- Install specified number of vapor extraction points and one vapor extraction pump.
- Install a water table depression pump in observation well #2 to begin recovering some dissolved contamination.
- Install two 55-gallon carbon tanks for the removal of dissolved organic contaminants, and coordinate for the discharge to be received by the Greater Hazleton Sewer Authority.
- Install additional observation wells as depicted on Figure 8.
- Initiate a one year program of maintenance and monitoring including monthly groundwater samples for treatment system evaluations, quarterly groundwater samples from 15 observation wells, weekly site visits for liquid level measurements and equipment adjustments.

This workscope will address the vapor phase contamination, partially address the adsorbed contamination, (which is most likely the phase which represents the largest percentage of contamination), begin to address the dissolved contamination,

further assess the horizontal extent of contamination, and provide a sound data base from which to base further remedial measures or closure negotiations.

Although it may be slightly premature to begin water table depression before having the plume fully defined, it is strongly recommended to gain control of the fugitive product and the dissolved plume.

5. COST ESTIMATE

The following costs have been estimated for the proposed workscope and are presented as not to exceed figures without change order procedures.

- Conduct Confirmatory Soil Sampling.....$ 3,100.00

  To include professional services to obtain 6 representative soil samples as before, necessary health and safety equipment, overnight courier charges, laboratory fees, and miscellaneous expenses.

- Conduct Vapor Extraction Pump Test..... $11,800.00

  Includes professional services necessary to schedule and install 5 vapor extraction points (VEP's) for the purpose of conducting a pump test, and conducting the actual pump test along with air sampling and interpretations. These costs also include subcontractual costs for a qualified drilling crew to install the VEP's, equipment rental fees to rent the vapor extraction pump, laboratory analytical fees for analysis of two air samples for industrial hygiene solvent screen, and miscellaneous expenses.

- Install VEP's as specified..... $34,300.00

  Includes professional services to schedule and install 10 additional VEP's, to trench between all VEP's, install a one horsepower vapor extraction pump, obtain neccessary permits and tie into existing catalytic incinerator. These costs also include subcontractual costs for drilling the points, equipment purchases for the air pump, P.V.C. for the vapor extraction points, along with ball valves, gravel pack and bentonite, rental equipment for the trenching and subcontractual costs for blacktop replacement.

- Install a Water Table Depression Pump $14,600.00

  Includes professional services to specify, purchase and install a standard 1/2 H.P. water table depression pump with solvent-compatible seals in observation well #2. This cost assumes an electrical supply (110 V., 20 amp) is available within 100 feet of OW-2 outside.

- Install Activated Carbon Treatment Unit....$ 4,000.00

  Includes the purchase of, and the professional services to install two 55-gallon activated carbon tanks and associated plumbing. Also includes limited negotiations with the Greater Hazleton Sewer Authority for the discharge of this treated water.

  Note: Assumes that a physical connection to the sanitary sewer is easily obtainable.

- Install Additional Observation Wells.....$24,800.00

  Includes professional services necessary to install seven (7) additional observation wells as depicted on figure 8 in a manner similar to previous installations (ie., 4-inch air rotary outside, 2-inch pneumatic inside) wells outside will be constructed of 4-inch P.V.C. well screen (0.020") from 10' to 40' below grade and 4-inch P.V.C. casing from the surface to 10 feet. Wells inside will be constructed of 2-inch P.V.C. well screen from 10' to 30', and 2-inch P.V.C. well casing from the surface to 10 feet. The wells will be gravel packed over the screened internal with a bentonite seal above this and grout to the surface.

- One Year Program of Maintenance/Monitoring..$66,000.00

  Includes the Following Worksteps:

  - o Weekly site visits for liquid level measurements and equipment calibrations/ adjustments.

- Sample treatment system influent/effluent weekly for one month and monthly thereafter for one year to document removal efficiency.
- Sample 15 observation wells quarterly for one-year to illustrate long-term trends in dissolved plume dimensions.
- Prepare quarterly update reports with laboratory analyses and field data collected during that period.

In summary, the costs are outlined as follows:

- Conduct Confirmatory Sampling.....$ 3,100.00
- Conduct Vapor Extraction Pump Test.....$11,800.00
- Install VEP's as specified.....$34,300.00
- Install a Water Table Depression Pump.....$14,600.00
- Install Activited Carbon Treatment.....$ 4,000.00
- Install Addition Observation Wells.....$24,800.00
- One year program of Maint./Monitoring.....$66,000.00

Total.....$158,600.00

6. REFERENCES

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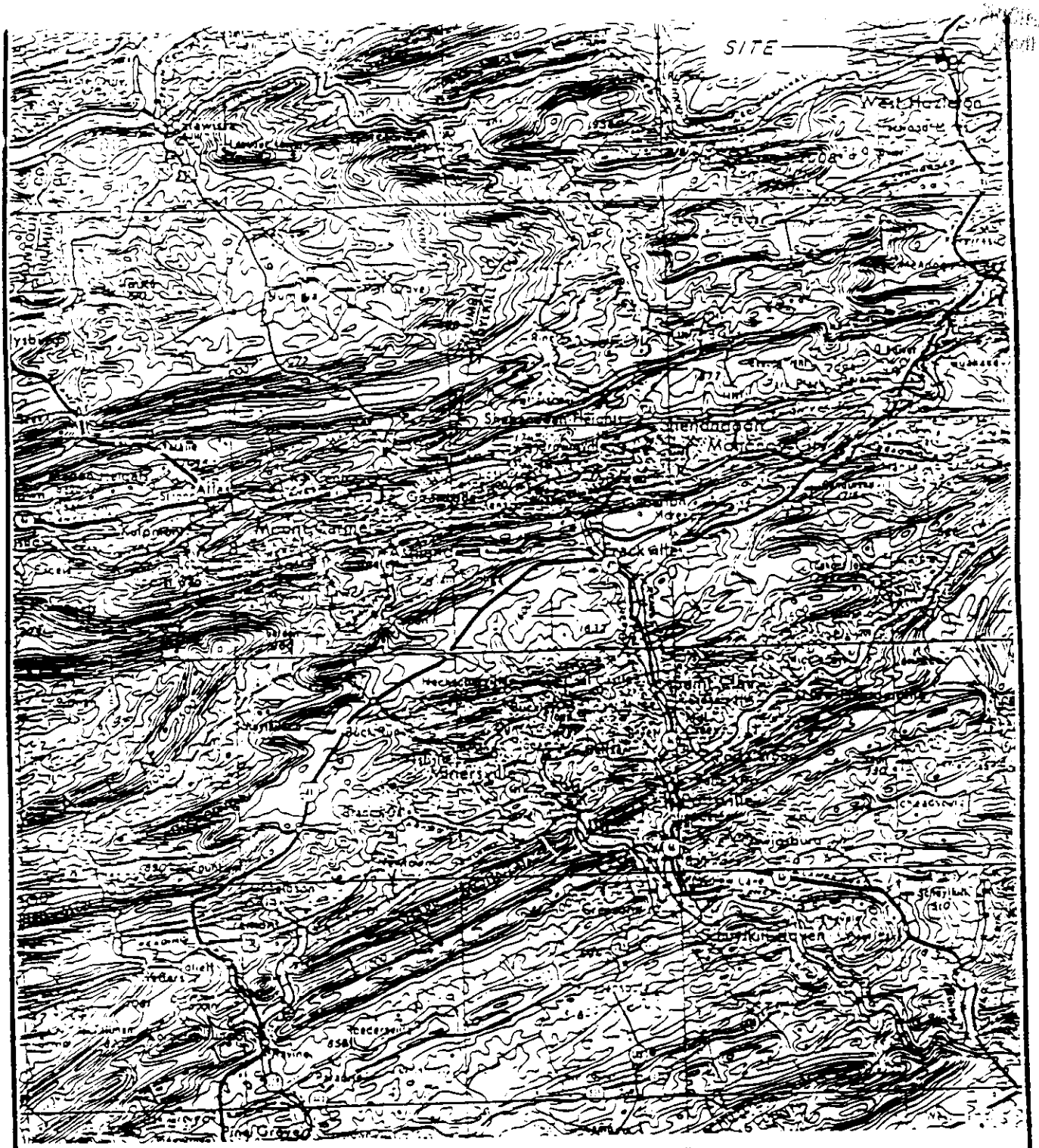
FIGURES



NORTH

SOURCE: U.S.G.S.
HARRISBURG
1:250,000 SERIES

FIGURE 1
SITE LOCATION
CONTINENTAL WHITE CAP
HAZELTON, PA.

0 5
MILES

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

AR100860

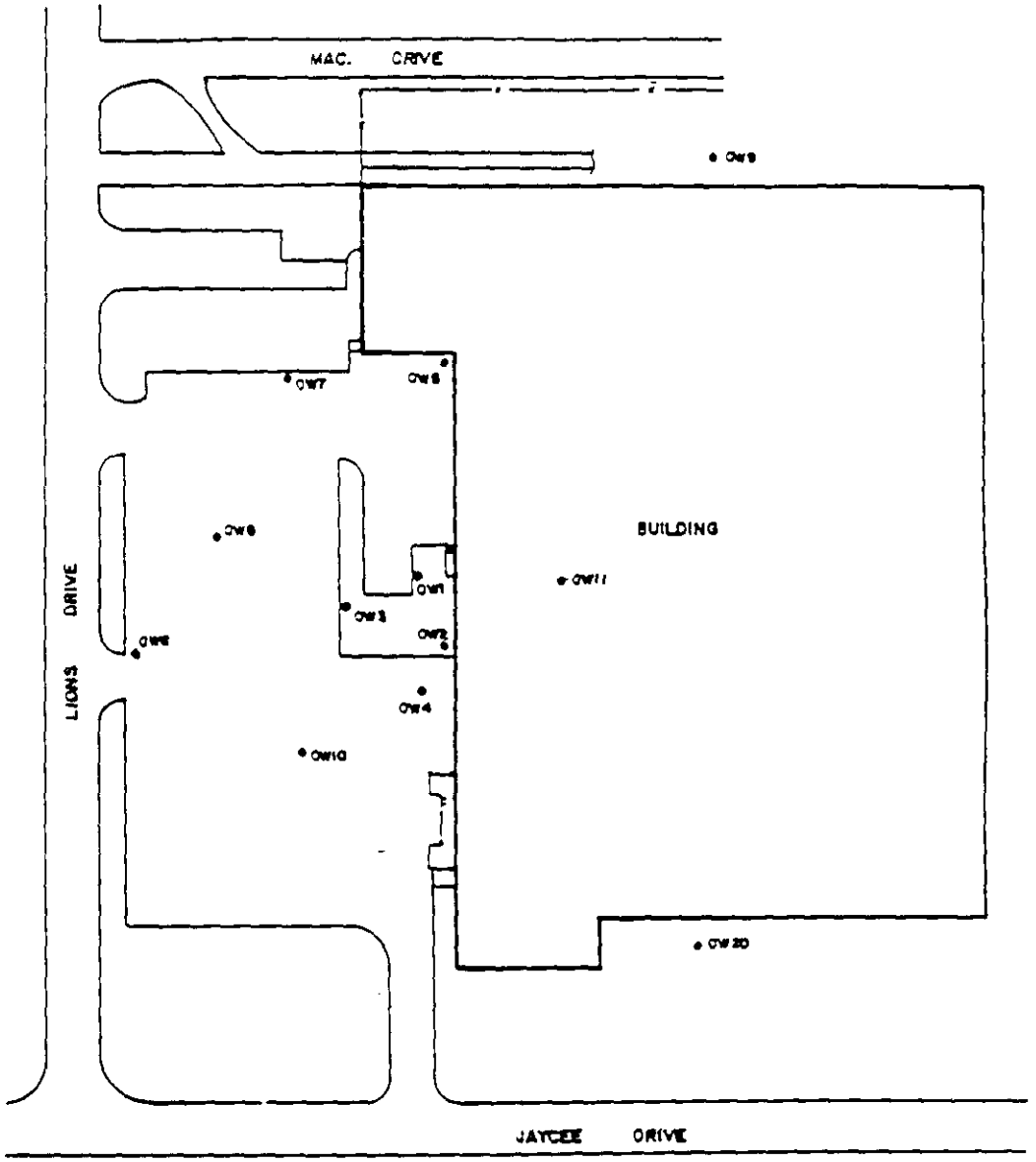


FIGURE 2
WELL LOCATIONS
CONTINENTAL WHITE CAP
HAZELTON, PA.

0 50 100'

GROUNDWATER TECHNOLOGY, INC.

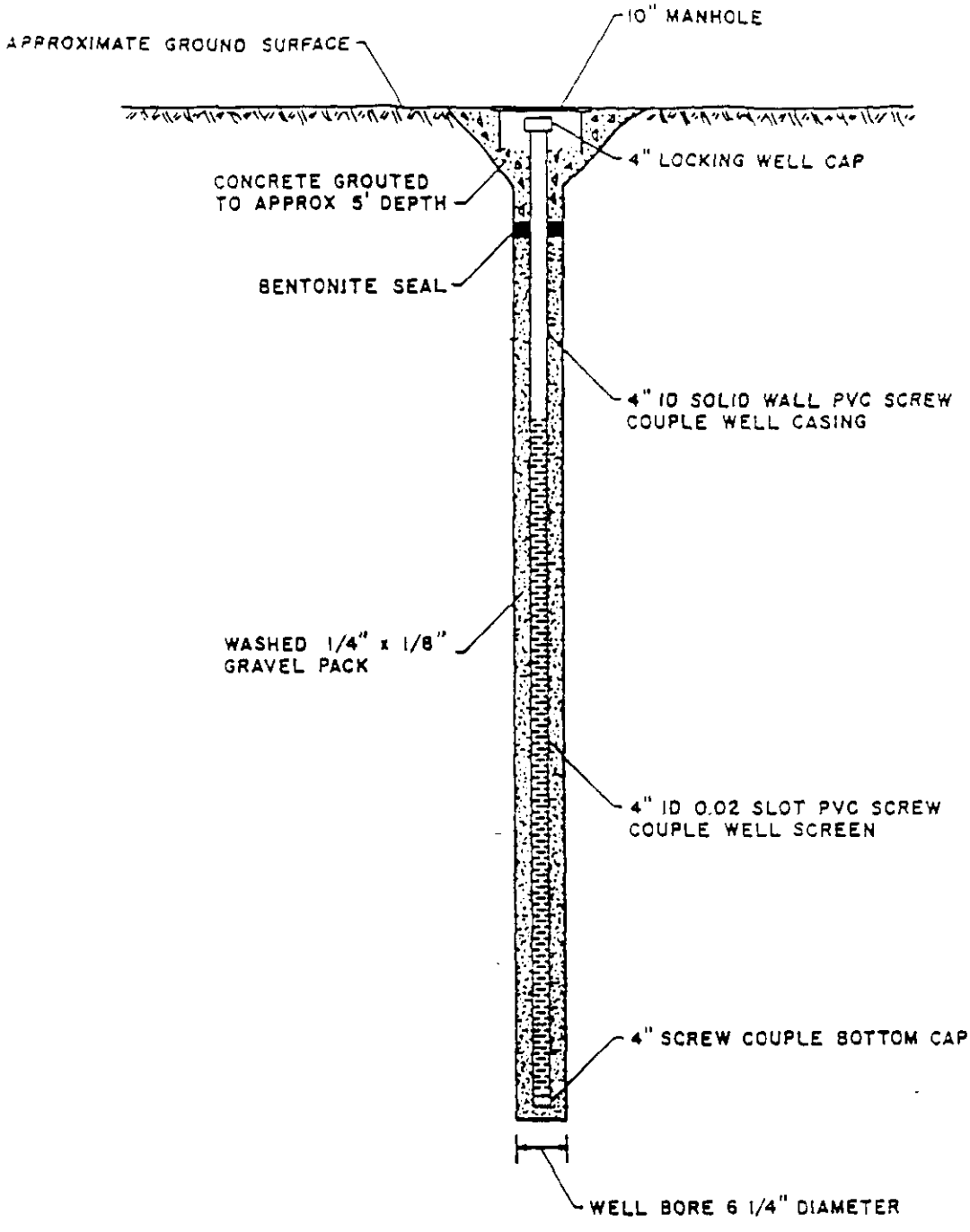


FIGURE 3
TYPICAL WELL CONSTRUCTION

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

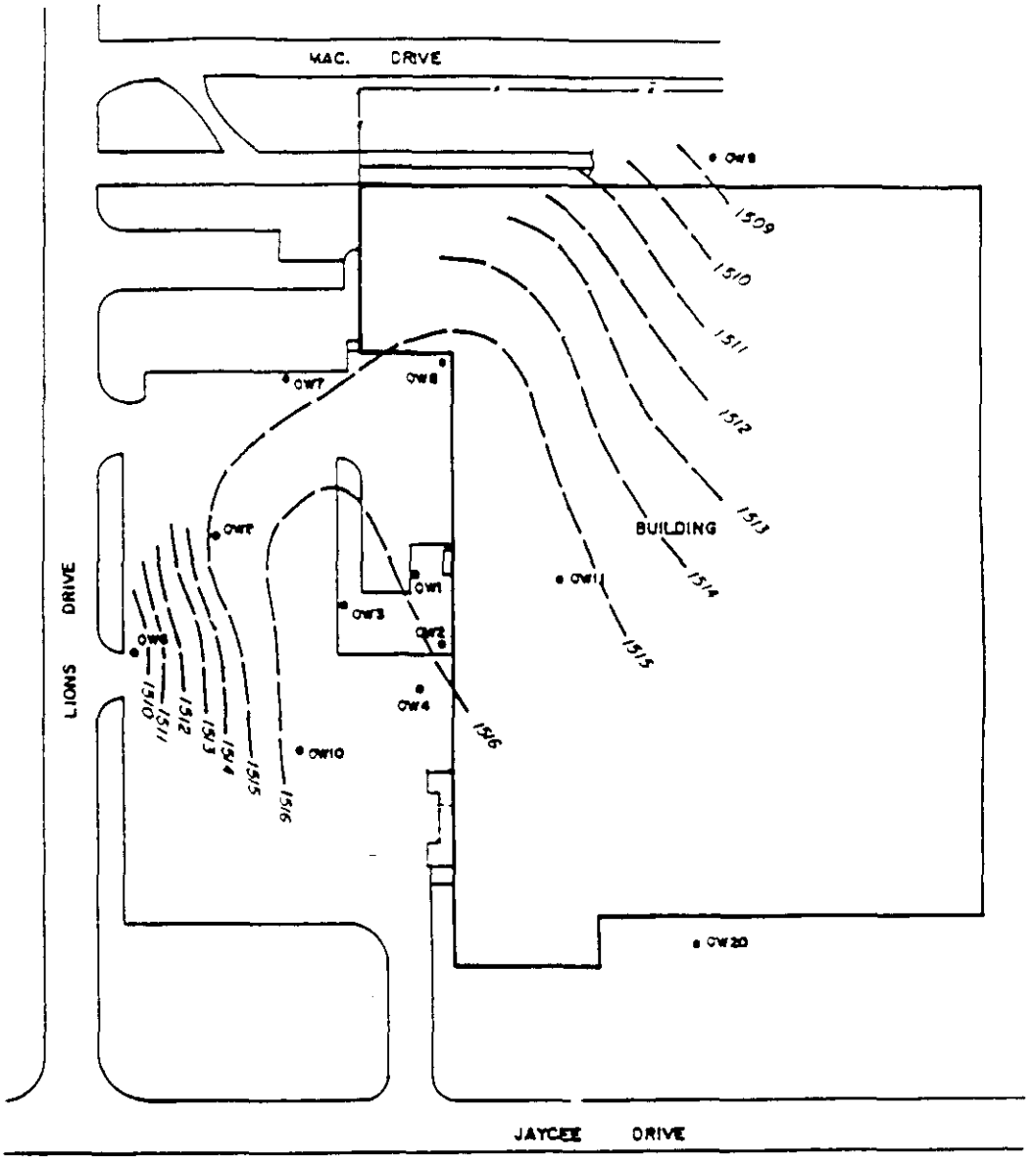


FIGURE 4
WATER TABLE GRADIENT (ft.)
DATA FROM AUGUST 29, 1989
CONTINENTAL WHITE CAP
HAZELTON, PA.

0 50 100

GROUNDWATER TECHNOLOGY, INC.

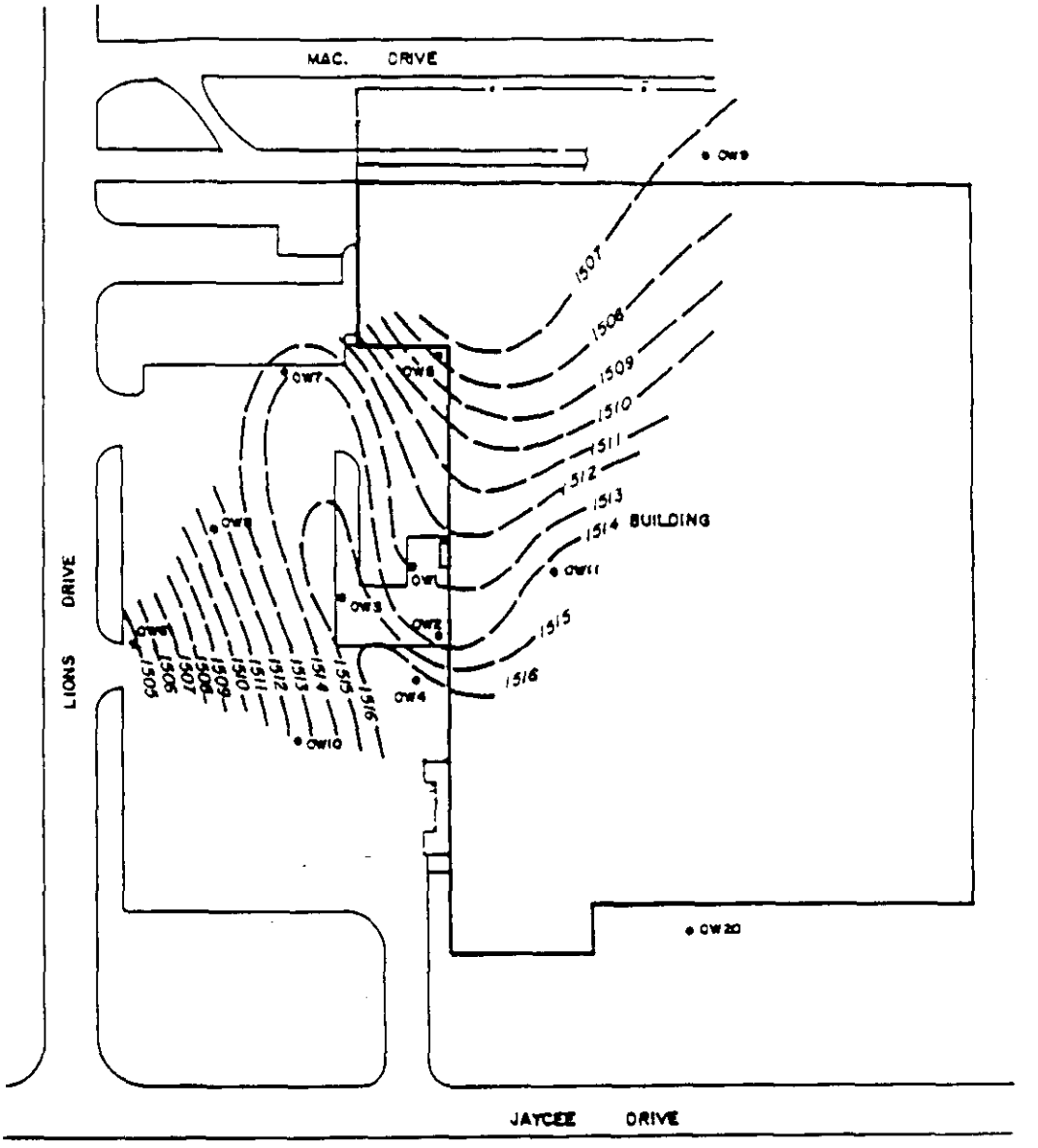


FIGURE 5
WATER TABLE GRADIENT (ft.)
DATA FROM SEPTEMBER 20, 1989
CONTINENTAL WHITE CAP
HAZELTON, PA.

0 50 100'

GROUNDWATER TECHNOLOGY, INC.

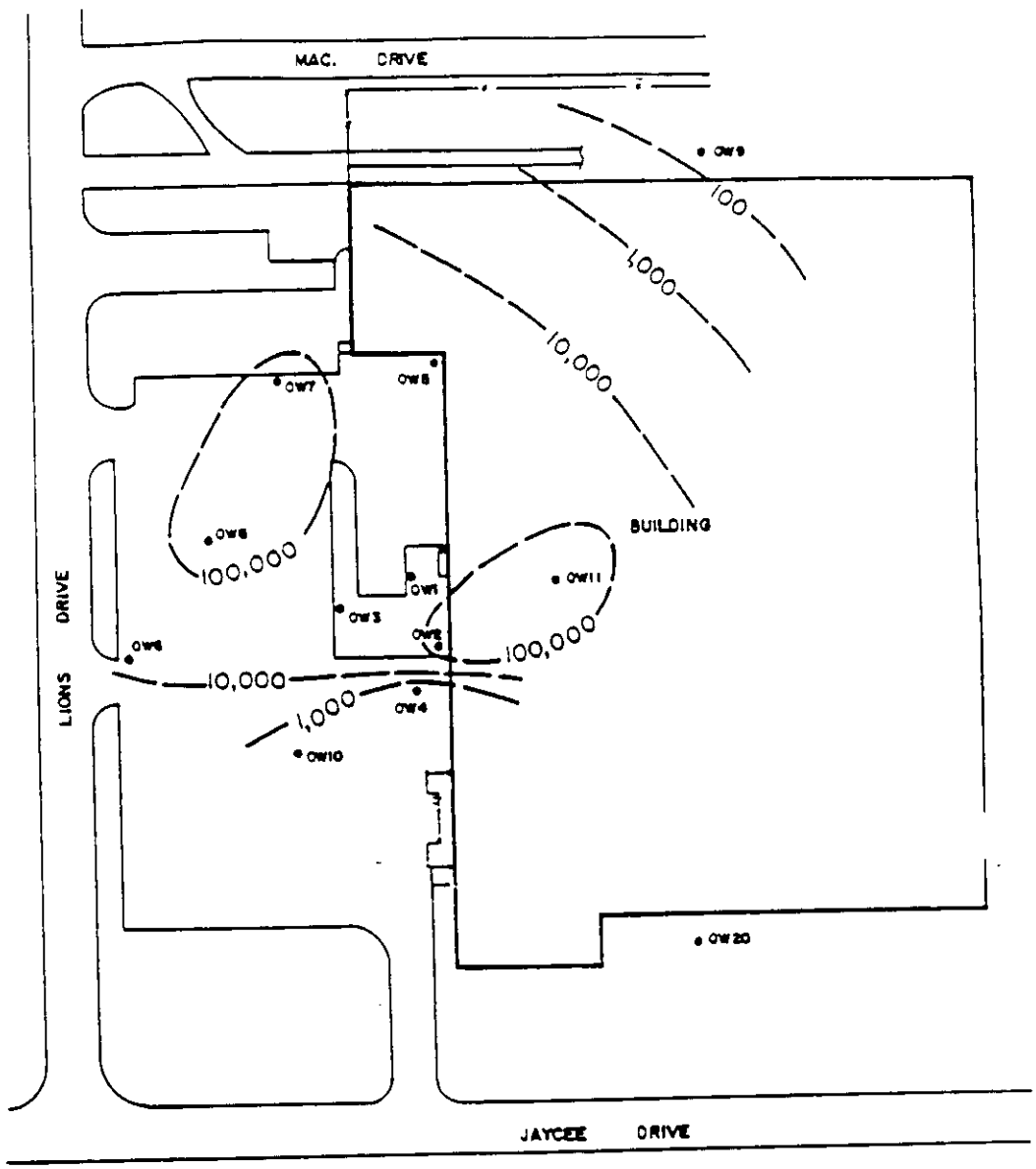


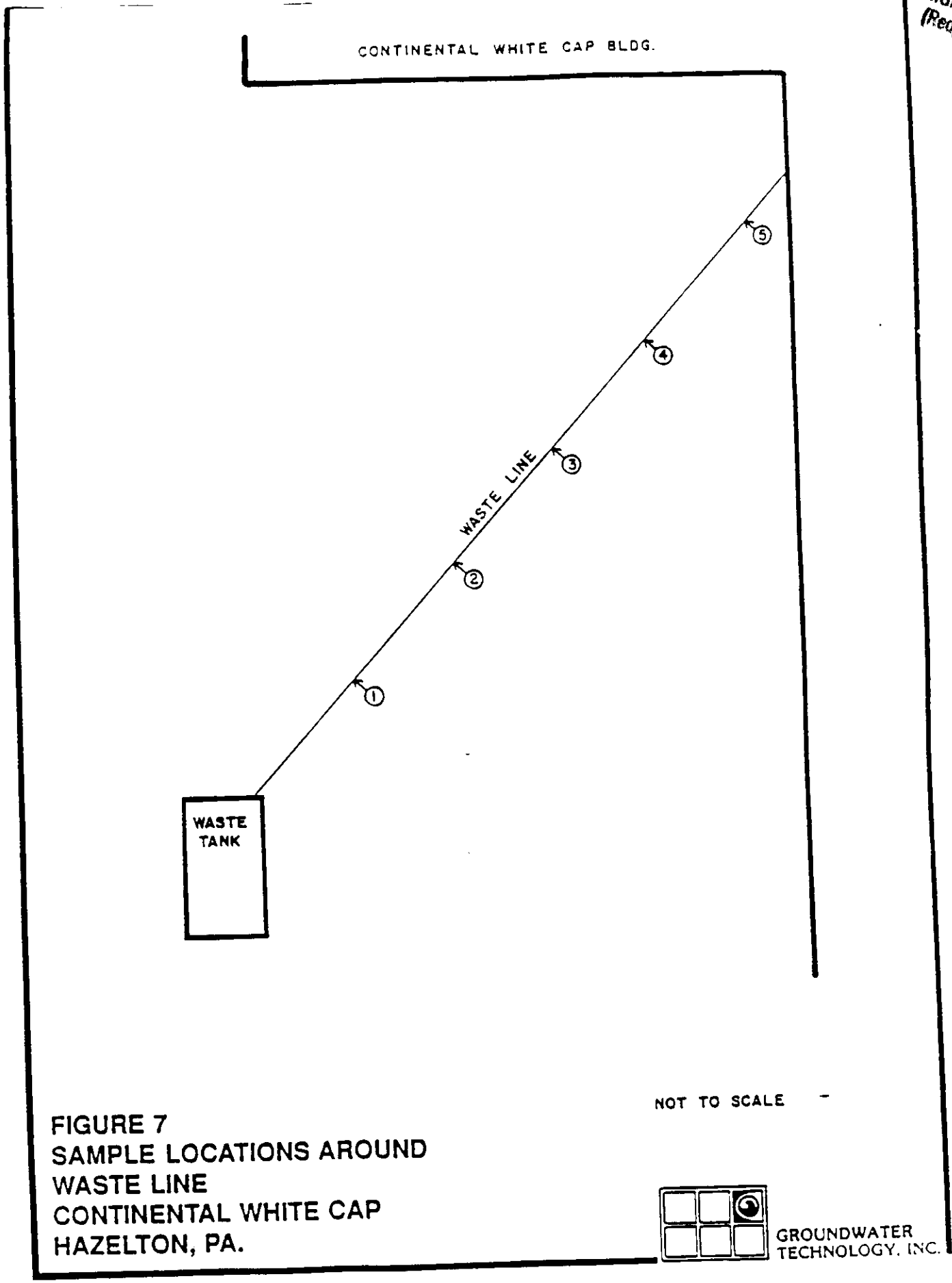
FIGURE 6
TOTAL VOC CONCENTRATIONS (ppb)
DATA FROM 11 SEPTEMBER 1989
CONTINENTAL WHITE CAP
HAZELTON, PA.

0 50 100'

GROUNDWATER TECHNOLOGY INC.

AR100865

ORIGINAL (Red)



NOT TO SCALE

FIGURE 7
SAMPLE LOCATIONS AROUND
WASTE LINE
CONTINENTAL WHITE CAP
HAZELTON, PA.

GROUNDWATER TECHNOLOGY, INC.

AR100866

ORIGINAL
(Red)

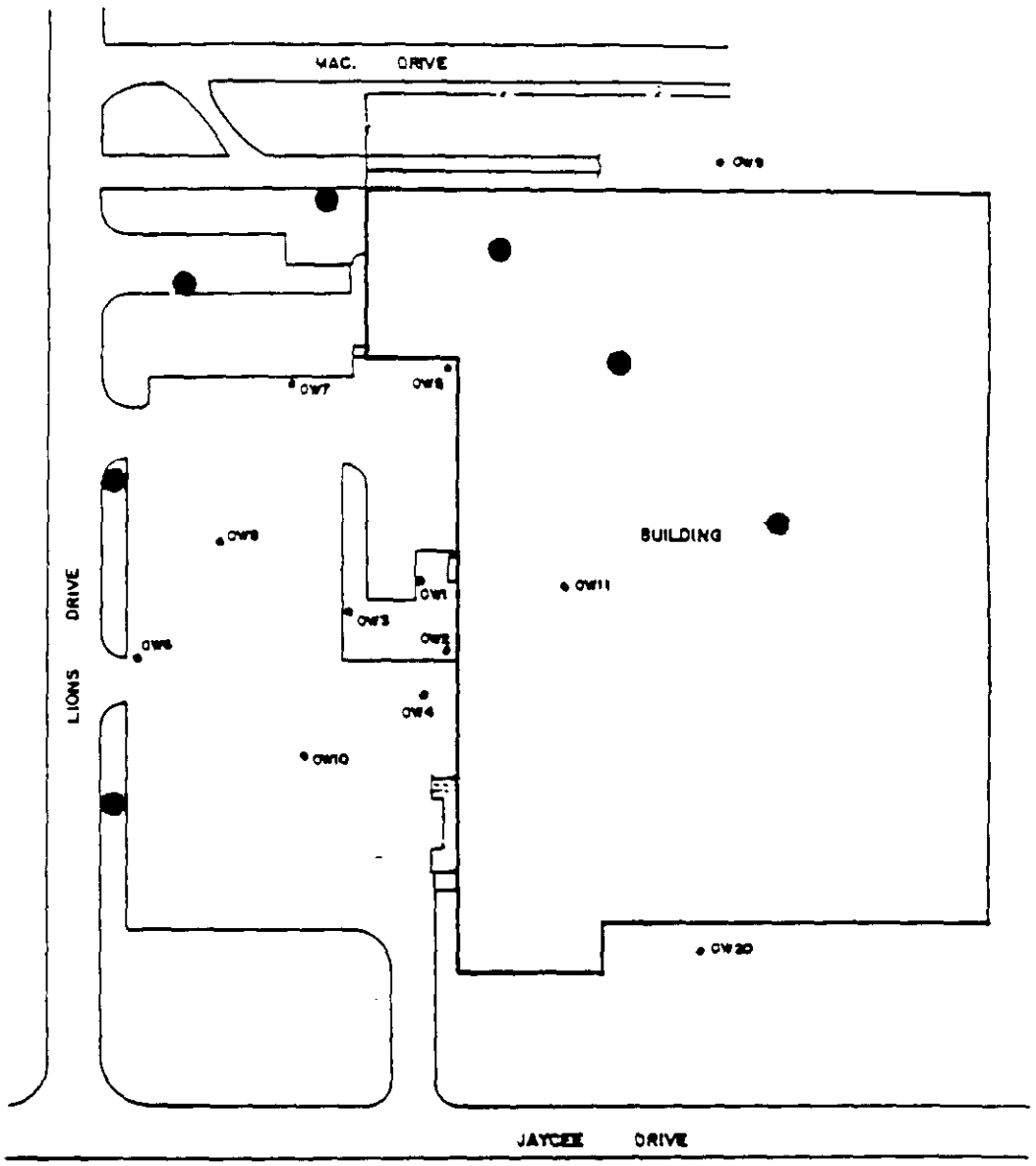


FIGURE 8
PROPOSED WELL LOCATIONS
CONTINENTAL WHITE CAP
HAZELTON, PA.

GROUNDWATER TECHNOLOGY, INC.

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whitecap
PROJECT NAME:
PROJECT NUMBER: 302-002-R4F4
LOCATION: [redacted] Charleston, PA
DRILLER: Mayer

DATE 6/2/89 WELL NUMBER MW 7

CASED FROM 0' TO 10' WITH 4" PVC
SCREENED FROM 10' TO 40' WITH .02" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG TH W
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY T. LaBarbera

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			→ Asphalt, gravel		
			Light brown/red sandy CLAY with		
	5		various fractured Sandstone rock	0 ppm	
			fragments		
			→ Gray sandy CLAY w/above rock frags		
			→ Red as above		
	10		→ Brown as above	300 ppm	strong solvent odor
			→ Dark gray SILTSTONE		
			→ Brown/red SILTSTONE		
	15		Dark brown SILTSTONE	300 ppm	
				102 ppm	
	20				Water added for
			Dark gray SILTSTONE		dust control 5'-25'
	25			11 ppm	
			Brown SILTSTONE		Slight moisture
			Dark gray fractured SILTSTONE	22 ppm	25' to 40'
	30		→ COAL clean		
			Brown/red fractured SILTSTONE		
	35			1.2 ppm	
			Gray fractured silty SHALE		
				442 ppm	
	40				

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whitecap
PROJECT NAME:
PROJECT NUMBER: 302-003-8484
LOCATION: Hazleton, Pa
~~[illegible]~~
DATE 6/2/89 WELL NUMBER MW 8
DRILLER: Moyer

CASED FROM 0' TO 10' WITH 4" PVC
DRILL RIG T4W
SCREENED FROM 10' TO 40' WITH .02" slot PVC
DRILL METHOD Air Rotary
WELL DEPTH 40' WELL DIAMETER 8"
DATE(S) DRILLED 30 May 1989
ELEVATION
LOGGED BY J. LaBarbera
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DEPTH	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
	asphalt, gravel		
	Tan/Brown, sandy CLAY with small gravels		
	Tan, sandy CLAY		
5	Brown/Red sandy CLAY	2.5ppm	
	Light gray/Buff, varisized, subangular SANDSTONE	7ppm	Water added for dust control
10	Light tan/Brown, competent SANDSTONE		
15	Tan, competent Sandstone CONGLOMERATE	4ppm	Slight moisture at 18'
20	Buff, competent SANDSTONE	188ppm	
25	Brown/Gray, fine grained SAND with varisized subround SANDSTONE gravels	105ppm	Very strong solvent odor
30	Gray, competent SANDSTONE	85ppm	
	Dark gray, competent SANDSTONE		Slightly fractured 34'
35	Light brown SAND with small SANDSTONE gravels	7ppm	Strong solvent odor
	Brown competent SANDSTONE		
40	Gray/Red competent SANDSTONE	20ppm	

AR100870

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whites (ORIGINAL)
PROJECT NAME:
PROJECT NUMBER: 302-000-6454
LOCATION: Hazleton, Pa.
DRILLER: Moyer

DATE 6/2/89 WELL NUMBER MW 9

CASED FROM 0' TO 10' WITH 4" PVC
SCREENED FROM 10' TO 40' WITH .02" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG T-4 W
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY J. LaBarbara

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			Topsoil, gravel		
			Light brown, sandy CLAY		
			SANDSTONE		
			Red, sandy CLAY with small gravels		
	5		Gray, as above	0 ppm	Water added for dust control
			Brown/Red competent SANDSTONE	5	
	10		Brown/Gray, micaceous SILTSTONE with small grained sand	0 ppm	
			Brown/Red highly fractured SANDSTONE with some siltstone		Poorly consolidated
	15			0 ppm	
			Gray, competent SANDSTONE		
	20		Brown/Red slightly fractured SANDSTONE	3 ppm	
			Gray SANDSTONE		
			Red, competent SANDSTONE		
			Dark gray SANDSTONE		
	25		Dark brown SANDSTONE	0 ppm	
			Light red/Pink, competent SANDSTONE		
	30			0 ppm	
			Light brown, coarse grained SAND		Water in at 31' approx. 8 gpm
			Brown/Gray, competent Sandstone CONGLOMERATE		No further PID readings taken
	35				
			Gray/White, as above		
	40				

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whiteside
PROJECT NAME:
PROJECT NUMBER: 302-000-6452
LOCATION: Hazleton, PA.
DRILLER: Mayer

DATE 6/2/89 WELL NUMBER MW 10

CASED FROM 0' TO 15' WITH 4" PVC
SCREENED FROM 15' TO 40' WITH .08" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG TH W/
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY J. LaBarbera

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			Asphalt, gravel		No PID readings taken due to steady rains.
	5		Tan, sandy CLAY with small, subangular CONGLOMERATE rock fragments		
			Light tan as above.		
	10		Light gray/Buff as above		
			Yellow/Gray SAND with vari-sized subangular SANDSTONE rock fragments		
	15		Buff/Red SAND with vari-colored, varisized SANDSTONE rock fragments		
			Dark red competent SANDSTONE		
	20		Gray, as above		
			Brown/varicolored, varisized very coarse grained, poorly cemented Sandstone CONGLOMERATE		
	30				
	35		Gray/White, as above		
	40				No odors noted

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY, INC.

CLIENT: CONTINENTAL WHITE CAP
PROJECT NAME: CONTINENTAL WHITE CAP
PROJECT NUMBER: 302-000-8484
LOCATION: VALMONT INDUSTRIAL PARK HAZLETON, PA
DRILLER: OLD FORGE DRILLING COMPANY

DATE JULY 23, 1989 WELL NUMBER MW-11

CASED FROM 0 TO 8'4" WITH 2" Sched 40 PVC DRILL RIG ACKER SOIL CENTURY - Skid rig
SCREENED FROM 8'4" TO 28'4" WITH 2" .020 SLOT DRILL METHOD HOLLOW STEM AUGER - DIAMOND CORE
WELL DEPTH 28'4" WELL DIAMETER 2" DATE(S) DRILLED JULY 22 & JULY 23, 1989
ELEVATION - LOGGED BY CURT HERMAN
ANNULUS COMPLETION #2 MORIE GRAVEL TO 6'; bentonite seal to 3' below ~~grade~~ grade; Portland cement 3' to 6"; flush mounted with locking manhole cover

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
	0-8 inches		Concrete		diamond core
	8" to 11'-3"		Light brown sand, fine to medium grained, well sorted, very dry. Hit competent rock at 11'-3"		hollow stem augers
	11'-3" to 18'-9"		whitish grey competent sandstone consisting of quartz, minor amounts of feldspar and biotite. Ore contains vertical fractures (mins) through the core. * Sandstone includes some shale interbeds which are deteriorating within the sandstone bedding plane at approximately 55° * Sandstone is fining with depth and changing color to dark grey and blue grey.		Diamond coring of competent rock
	18'-8" to 28'-8"		Mottled grey and red shale Competent with vertical fracturing (mins) throughout the core.		

AR100873

APP. II

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazleton, PA
DATE: 29 August 1989

BSERVATION WELLS

NO.	DTW	DTP	PT	ELEV.	ELEV-W	ELEV-P	COMMENTS
1	21.70			1537.07	1515.37		
2	21.97			1537.34	1515.37		
3	13.59			1536.18	1522.59		
4	20.36			1537.29	1516.93		
5	18.69			1534.33	1515.64		
6	22.36			1531.66	1509.30		
7	18.69			1533.59	1514.90		
	17.82			1533.55	1515.73		
9	26.86			1535.77	1508.91		
10	18.39			1534.95	1516.56		
11				1539.04			TOO MUDDY
20	21.81			1538.47	1516.66		

COMMENTS:

DATA RECORDED BY: Don Corcoran

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazleton, Pa.
DATE: 20 September 1989

BSERVAT ON WELLS

NO.	DTW	DTP	PT	ELEV.	ELEV-W	ELEV-P	COMMENTS
1	24.36			1537.07	1512.71		
2	24.01	23.96	.05	1537.34	1513.33		
3	13.39			1536.18	1522.79		
4	21.26			1537.29	1516.03		
5	26.92			1534.33	1507.41		
6	27.36			1531.66	1504.30		
7	19.68			1533.59	1513.91		
8	21.99			1533.55	1511.56		
9	28.16			1535.77	1507.61		
10	22.36			1534.95	1512.59		
11	24.12			1539.04	1514.92		
20	24.43			1538.47	1514.04		

COMMENTS: _____

DATA RECORDED BY: J. LaBarber

APP. III

GTEL
ENVIRONMENTAL
LABORATORIES, INC.
Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8484

Work Order No.
M9-09-502

10/9/89
Submitted to: Ray Fenstermacher
Groundwater Technology
U.S. Route 1, Concord Building
Chadds Ford, PA 19317

Sample Identification:
The attached report covers 1 water sample taken on 9/21/89 at site # 302-000-8484, Hazelton, Pennsylvania.

Method:
Analysis was performed for volatile organics by purge and trap GC/MS as per EPA Method 624. Detection limits are listed on the report. Samples that are diluted in order to maintain the calibrated range of the instrument are indicated by a footnote giving the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 624.

Results:
Results are reported in ug/L (ppb).

Respectfully submitted,

Dave Reese
Extractable Organics Manager
DRR/CH

CC: Joe McCarthy
Groundwater Technology
486 South Mt Bvld
MT Top, PA 18707

ORIGINAL (Red)

Report No.
302-000-8484

Work Order No.
M9-09-502

Volatile Organics Analysis

Sample No.	01
ID	WELL #11
Date Sampled	9/21/89
Date Analyzed	10/2/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	1200	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	4400	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	28000	4.5
Total-Xylene	120000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND *	40

Notes: ND = Not Detected
* = Sample diluted by a factor of 100.

GTEL ENVIRONMENTAL LABORATORIES, INC.

GTEL ENVIRONMENTAL LABORATORIES INC

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

ORIGINAL (Red)

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 18806

Project Manager: Ray Frostemacher — Phone #: 215-388-1422

Address (Office): Chadds Ford — Site Location: Hazleton

Project Number: 3PA-0002-8484 — Project Name: CWC

I attest that the proper field sampling procedures were used during the collection of these samples. — Sampler Name (Print): Joseph L. McCarthy

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER	Sampling: DATE	TIME
Well #11			3	X					X			X			7/21	1:00pm

ANALYSIS REQUEST

Field Sample ID	Gas. Hydrocarbons by 602 ☐ 8020 ☐ MS ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	MTBE only by 602 ☐ 8020 ☐	EDB by 504	Oil and Grease 413.1 ☐ 413.2 ☐ 503B+E ☐	Petroleum Hydrocarbons 418.1 ☐ 5030+E ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ OCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐	EPA 608 PCB only ☐ 8080 PCB only ☐	EPA 624 ☒ 8240 ☐ NBS ☐	EPA 625 ☐ 8270 ☐ NBS ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS ☐	EPA 610 ☐ 8310 ☐	EPTOX - 8 Metals	EPA - Priority Pollutant Metals	LEAD 239.2 ☐ 200.7 ☐ 7421 ☐ 6010 ☐	TCLP - Metals	TCLP VOA ☐ Semi VOA ☐	Cyclohexane	Diacetone Alcohol	Xylene
Well #11												X										X	X	X

CUSTODY RECORD		
Received by: Federal Express	Date 7/21/89	Time 3:00
Received by:	Date	Time
Received by Laboratory: [illegible] Way Bill #	Date 7/22	Time 11:45
Relinquished by Sampler: Joseph L. McCarthy		
Relinquished by:		
Relinquished by:		

SPECIAL HANDLING

PRIORITY ONE (24 hrs) ☐

EXPEDITED (2-4 days) ☐

QA/QC Red Level ☐ Blue Level ☐

VERBAL ☐ FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
Please send copy of Report to Both Proj. Manager & MC-TOC office attn Joe McCarthy

REMARKS
Lot #6504

ORIGINAL

Report No. (Red)
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	03
ID	WELL #3
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	360	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	360	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	6000	4.5
Total-Xylene	28000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0
	*1	

Notes: ND = Not Detected
*1 = Sample diluted by a factor of 100.

GTEL ENVIRONMENTAL LABORATORIES INC

ORIGINAL
(Red)

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	04
ID	WELL #4
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	9.2	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	75	4.5
Total-Xylene	460	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0

Notes: ND = Not Detected

GTEL
ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	05
ID	WELL #5
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	350	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	610	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	9300	4.5
Total-Xylene	51000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0
	*1	

Notes: ND = Not Detected
*1 = Sample diluted by a factor of 100.

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	06
ID	WELL #6
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	38	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	250	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	610	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	1800	4.5
Total-Xylene	8000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0
	*2	

Notes: ND = Not Detected
*2 = Sample diluted by a factor of 10.

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	07
ID	WELL #7
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	420	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	4700	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	21000	4.5
Total-Xylene	120000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0
	*1	

Notes: ND = Not Detected
*1 = Sample diluted by a factor of 100.

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	08
ID	WELL #8
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	31	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	BDL	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	2600	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	4800	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	23000	4.5
Total-Xylene	110000	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0
	*2	

Notes: ND = Not Detected
BDL= Below Detection Limit
*2 = Sample diluted by a factor of 10.

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8484

Work Order No.
M9-09- 39

Volatile Organics Analysis

Sample No.	09
ID	WELL #9
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	83	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	ND	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	ND	4.5
Total-Xylene	5.9	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0

Notes: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES, INC

Report No.
302-000-8484

Work Order No.
M9-09-239

Volatile Organics Analysis

Sample No.	10
ID	WELL #10
Date Sampled	9/11/89
Date Analyzed	9/20/89

Parameter	Concentration ug/L	Detection Limit
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
1,1,1-Trichloroethane	47	2.6
Carbon Tetrachloride	ND	2.1
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	190	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	4.4	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	34	4.5
Total-Xylene	250	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0
Diacetone Alcohol	ND	40.0

Notes: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

GTEL Environmental Laboratories Inc

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 18768

Project Manager: Ray Fenstermacher
Phone #: 215-388-1722
Address (Office): Chadds Ford
Site Location: Hazelton
Project Number: 302-002-4484
Project Name: CWC
I attest that the proper field sampling procedures were used during the collection of these samples.
Sampler Name (Print): Joseph L. McCarthy

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# CONTAINERS	Matrix: WATER	SOIL	AIR	SLUDGE	OTHER	Method Preserved: HCl	HNO_3	H_2SO_4	ICE	NONE	OTHER	Sampling: DATE	TIME
Well #1			2	X					X			X			7/4/88	
Well #2			2	X					X			X			"	
Well #3			2	X					X			X			"	
Well #4			2	X					X			X			"	
Well #5			2	X					X			X			"	
Well #6			2	X					X			X			"	
Well #7			2	X					X			X			"	
Well #8			2	X					X			X			"	
Well #9			2	X					X			X			"	
Well #10			2	X					X			X			"	

ANALYSIS REQUEST

Field Sample ID	Gas Hydrocarbons by 602 ☐ 8020 ☐ MS ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	MTBE only by 602 ☐ 8020 ☐	EDB by 504	Oil and Grease 413.1 ☐ 413.2 ☐ 503B-E ☐	Petroleum Hydrocarbons 418.1 ☐ 503D-E ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐	EPA 608 PCB only ☐ 8080 PCB only ☐	EPA 624 ☒ 8240 ☐ NBS ☐	EPA 625 ☐ 8270 ☐ NBS ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS ☐	EPA 610 ☐ 8310 ☐	EPTOX - 8 Metals	EPA - Priority Pollutant Metals	LEAD 239.2 ☐ 200.7 ☐ 7421 ☐ 6010 ☐	TCLP - Metals	TCLP VOA ☐ Semi VOA ☐	Cyclohexanone	Diacetone Alcohol	
Well #1												X										X	X	
Well #2												X										X	X	
Well #3												X										X	X	
Well #4												X										X	X	
Well #5												X										X	X	
Well #6												X										X	X	
Well #7												X										X	X	
Well #8												X										X	X	
Well #9												X										X	X	
Well #10												X										X	X	

CUSTODY RECORD

Relinquished by Sampler	Date	Time	Received by
[signature]	1/4/88	4:00	Federal Express

Relinquished by	Date	Time	Received by

Relinquished by	Date	Time	Received by Laboratory	Way bill #
	[illegible]	[illegible]	[illegible]	

SPECIAL HANDLING

PRIORITY ONE (24 hrs) ☐

EXPEDITED (2-4 days) ☐

QA/QC Red Level ☐ Blue Level ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
Please send copy of Report to Both ... & MT Tel..., attn: Joe McCarthy

REMARKS:

9.5ª
402

AR100889

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8684-7

3/22/89
Submitted to:

Peter C. Borst
Groundwater Technology
U.S. Route 1
Concord Building
Chadds Ford, PA 19317

This report previously dated 2/28/89, is a reissue.
Sample Identification:
The attached report covers soil samples # 93360-93364 taken on 2/15/89 at site # 302-000-8684, Hazelton, Pennsylvania.

Method:
Analysis was performed for volatile organics by purge and trap GC/MS as per EPA Method 8240. Detection limits are listed on the report. Samples that were diluted in order to maintain the calibrated range of the instrument are indicated by a footnote giving the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8240.

Results:
Results are reported in ug/Kg (ppb.).

Prepared by:

Dave Reese
Extractable Organics Manager
DRR/CH

Lois Luniewicz
QA Liaison

cc: Joe McCarthy
Groundwater Technology
486 South Mt. Top Blvd.
Mt. Top, PA 18707

Report No.
302-000-8684-7

Volatile Organics Analysis

Sample No.	93360
ID	WASTE LINE 1
Date Sampled	2/15/89
Date Analyzed	2/21/89

Parameter	Concentration ug/Kg	Detection Limit
Diacetone Alcohol	ND	40
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Acetone	13	6.7
Carbon Disulfide	ND	4.5
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
2-Butanone	ND	15.0
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Vinyl Acetate	ND	3.6
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
4-Methyl-2-Pentanone	ND	7.3
2-Hexanone	ND	9.2
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	ND	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	ND	4.5
Styrene	ND	4.0
Total-Xylene	ND	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0

Notes: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684-7

Volatile Organics Analysis

Sample No.	93361
ID	WASTE LINE 2
Date Sampled	2/15/89
Date Analyzed	2/21/89

Parameter	Concentration ug/Kg	Detection Limit
Diacetone Alcohol	ND	40
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Acetone	110	6.7
Carbon Disulfide	ND	4.5
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
2-Butanone	ND	15.0
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Vinyl Acetate	ND	3.6
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
4-Methyl-2-Pentanone	ND	7.3
2-Hexanone	ND	9.2
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	ND	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	BDL	4.5
Styrene	ND	4.0
Total-Xylene	17	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0

Notes: ND = Not Detected
BDL = Below Detection Limit

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684-7

Volatile Organics Analysis

Sample No.	93362
ID	WASTE LINE 3
Date Sampled	2/15/89
Date Analyzed	2/22/89

Parameter	Concentration ug/Kg	Detection Limit
Diacetone Alcohol	ND	3500
Chloromethane	ND	1000
Bromomethane	ND	1000
Vinyl Chloride	ND	1000
Chloroethane	ND	1000
Methylene Chloride	ND	500
Acetone	ND	1000
Carbon disulfide	ND	500
Trichlorofluoromethane	ND	500
1,1-Dichloroethene	ND	500
1,1-Dichloroethane	ND	500
Trans-1,2-Dichloroethene	ND	500
Chloroform	ND	500
1,2-Dichloroethane	ND	500
2-Butanone	ND	1000
1,1,1-Trichloroethane	ND	500
Carbon Tetrachloride	ND	500
Vinyl acetate	ND	1000
Bromodichloromethane	ND	500
1,2-Dichloropropane	ND	500
Cis-1,2-Dichloropropene	ND	500
Trichloroethene	ND	500
Benzene	ND	500
Dibromochloromethane	ND	500
Trans-1,3-Dichloropropene	ND	500
1,1,2-Trichloroethane	ND	500
Ethylene Dibromide	ND	500
2-Chloroethylvinylether	ND	1000
Bromoform	ND	500
4-Methyl-2-Pentanone	ND	1000
2-Hexanone	ND	1000
Tetrachloroethene	ND	500
1,1,2,2,-Tetrachloroethane	ND	500
Toluene	BDL	500
Chlorobenzene	ND	500
Ethylbenzene	11000	500
Styrene	ND	500
Total-Xylene	87000	500
M-Dichlorobenzene	ND	500
O&P-Dichlorobenzene	ND	500
Cyclohexanone	ND	500

Notes: ND = Not Detected
BDL= Below Detection Limit

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684-7

Volatile Organics Analysis

Sample No.	93363
ID	WASTE LINE 4
Date Sampled	2/15/89
Date Analyzed	2/22/89

Parameter	Concentration ug/Kg	Detection Limit
Diacetone Alcohol	ND	3500
Chloromethane	ND	1000
Bromomethane	ND	1000
Vinyl Chloride	ND	1000
Chloroethane	ND	1000
Methylene Chloride	ND	500
Acetone	ND	1000
Carbon disulfide	ND	500
Trichlorofluoromethane	ND	500
1,1-Dichloroethene	ND	500
1,1-Dichloroethane	ND	500
Trans-1,2-Dichloroethene	ND	500
Chloroform	ND	500
1,2-Dichloroethane	ND	500
2-Butanone	ND	1000
1,1,1-Trichloroethane	ND	500
Carbon Tetrachloride	ND	500
Vinyl acetate	ND	1000
Bromodichloromethane	ND	500
1,2-Dichloropropane	ND	500
Cis-1,2-Dichloropropene	ND	500
Trichloroethene	ND	500
Benzene	ND	500
Dibromochloromethane	ND	500
Trans-1,3-Dichloropropene	ND	500
1,1,2-Trichloroethane	ND	500
Ethylene Dibromide	ND	500
2-Chloroethylvinylether	ND	1000
Bromoform	ND	500
4-Methyl-2-Pentanone	ND	1000
2-Hexanone	ND	1000
Tetrachloroethene	ND	500
1,1,2,2,-Tetrachloroethane	ND	500
Toluene	BDL	500
Chlorobenzene	ND	500
Ethylbenzene	22000	500
Styrene	ND	500
Total-Xylene	179000	500
M-Dichlorobenzene	ND	500
O&P-Dichlorobenzene	ND	500
Cyclohexanone	ND	500
	*1	

Notes: ND = Not Detected
BDL= Below Detection Limit
*1 = SAmple diluted by a factor of 10.

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684-7

Volatile Organics Analysis

Sample No.	93364
ID	WASTE LINE 5
Date Sampled	2/15/89
Date Analyzed	2/22/89

Parameter	Concentration ug/Kg	Detection Limit
Diacetone Alcohol	ND	40
Chloromethane	ND	5.0
Bromomethane	ND	1.7
Vinyl Chloride	ND	1.8
Chloroethane	ND	1.2
Methylene Chloride	ND	2.2
Acetone	11	6.7
Carbon Disulfide	ND	4.5
Trichlorofluoromethane	ND	0.7
1,1-Dichloroethene	ND	1.1
1,1-Dichloroethane	ND	4.5
Trans-1,2-Dichloroethene	ND	1.6
Chloroform	ND	1.6
1,2-Dichloroethane	ND	1.6
2-Butanone	ND	15.0
1,1,1-Trichloroethane	ND	2.6
Carbon Tetrachloride	ND	2.1
Vinyl Acetate	ND	3.6
Bromodichloromethane	ND	2.1
1,2-Dichloropropane	ND	2.8
Cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.9
Benzene	ND	1.7
Dibromochloromethane	ND	3.1
Trans-1,3-Dichloropropene	ND	2.4
1,1,2-Trichloroethane	ND	1.9
Ethylene Dibromide	ND	7.3
2-Chloroethylvinylether	ND	2.7
Bromoform	ND	5.7
4-Methyl-2-Pentanone	ND	7.3
2-Hexanone	ND	9.2
Tetrachloroethene	ND	2.2
1,1,2,2,-Tetrachloroethane	ND	6.0
Toluene	2.4	2.1
Chlorobenzene	ND	3.0
Ethylbenzene	160	4.5
Styrene	ND	4.0
Total-Xylene	1400	4.0
M-Dichlorobenzene	ND	6.5
O&P-Dichlorobenzene	ND	7.1
Cyclohexanone	ND	5.0

Notes: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

GTEL
ENVIRONMENTAL
LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8684

Work Order No.
M9-05-641

6/19/89
Submitted to:

Ray Fenstermacher
Groundwater Technology
U.S. Route 1
Chadds Ford, PA 19317

Sample Identification:
The attached report covers soil samples taken on 5/25/89 at site # 302-000-8684-(04), Hazelton, Pennsylvania.

Method:
Analysis was performed for volatile organics by purge and trap GC/MS as per EPA Method 5030/8240. Detection limits are listed on the report. Samples are diluted in order to maintain the calibrated range of the instrument and so indicated by a footnote giving the factor by which the MDL is raised.

Sampling and sample handling and preservation are specified by this laboratory to be as per EPA Method 8240.

Results:
Results are reported in mg/kg (ppm).

Prepared by:

Dave Reese
Extractable Organics Manager
DRR/CH

cc: Joe McCarthy
Groundwater Technology
486 South Mt. Blvd.
Mt. Top, PA 18707

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	01
ID	Waste Line PT1
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration	mg/kg	Detection Limit
Cyclohexanone	ND		1.0
Chloromethane	ND		1.0
Bromomethane	ND		1.0
Vinyl Chloride	ND		1.0
Chloroethane	ND		1.0
Methylene Chloride	ND		0.5
Acetone	ND		1.0
Carbon disulfide	ND		0.5
Trichlorofluoromethane	ND		0.5
1,1-Dichloroethene	ND		0.5
1,1-Dichloroethane	ND		0.5
Trans-1,2-Dichloroethene	ND		0.5
Chloroform	ND		0.5
1,2-Dichloroethane	ND		0.5
2-Butanone	5.9		1.0
1,1,1-Trichloroethane	ND		0.5
Carbon Tetrachloride	ND		0.5
Vinyl acetate	ND		1.0
Bromodichloromethane	ND		0.5
1,2-Dichloropropane	ND		0.5
Cis-1,2-Dichloropropene	ND		0.5
Trichloroethene	ND		0.5
Benzene	ND		0.5
Dibromochloromethane	ND		0.5
Trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.5
Ethylene Dibromide	ND		0.5
2-Chloroethylvinylether	ND		1.0
Bromoform	ND		0.5
4-Methyl-2-Pentanone	ND		1.0
2-Hexanone	ND		1.0
Tetrachloroethene	ND		0.5
1,1,2,2,-Tetrachloroethane	ND		0.5
Toluene	ND		0.5
Chlorobenzene	ND		0.5
Ethylbenzene	ND		0.5
Styrene	ND		0.5
Total-Xylene	ND		0.5
M-Dichlorobenzene	ND		0.5
O&P-Dichlorobenzene	ND		0.5
Diacetone Alcohol	ND		1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	01
I.D.	Waste Line PT1
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES, INC

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	02
ID	Waste Line PT2
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration	mg/kg	Detection Limit
Cyclohexanone	ND		1.0
Chloromethane	ND		1.0
Bromomethane	ND		1.0
Vinyl Chloride	ND		1.0
Chloroethane	ND		1.0
Methylene Chloride	ND		0.5
Acetone	ND		1.0
Carbon disulfide	ND		0.5
Trichlorofluoromethane	ND		0.5
1,1-Dichloroethene	ND		0.5
1,1-Dichloroethane	ND		0.5
Trans-1,2-Dichloroethene	ND		0.5
Chloroform	ND		0.5
1,2-Dichloroethane	ND		0.5
2-Butanone	6.7		1.0
1,1,1-Trichloroethane	ND		0.5
Carbon Tetrachloride	ND		0.5
Vinyl acetate	ND		1.0
Bromodichloromethane	ND		0.5
1,2-Dichloropropane	ND		0.5
Cis-1,2-Dichloropropene	ND		0.5
Trichloroethene	ND		0.5
Benzene	ND		0.5
Dibromochloromethane	ND		0.5
Trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.5
Ethylene Dibromide	ND		0.5
2-Chloroethylvinylether	ND		1.0
Bromoform	ND		0.5
4-Methyl-2-Pentanone	ND		1.0
2-Hexanone	ND		1.0
Tetrachloroethene	ND		0.5
1,1,2,2,-Tetrachloroethane	ND		0.5
Toluene	ND		0.5
Chlorobenzene	ND		0.5
Ethylbenzene	ND		0.5
Styrene	ND		0.5
Total-Xylene	ND		0.5
M-Dichlorobenzene	ND		0.5
O&P-Dichlorobenzene	ND		0.5
Diacetone Alcohol	ND		1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	02
I.D.	Waste Line PT2
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	03
ID	Waste Line PT3
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration	mg/kg	Detection Limit
Cyclohexanone	ND		1.0
Chloromethane	ND		1.0
Bromomethane	ND		1.0
Vinyl Chloride	ND		1.0
Chloroethane	ND		1.0
Methylene Chloride	ND		0.5
Acetone	ND		1.0
Carbon disulfide	ND		0.5
Trichlorofluoromethane	ND		0.5
1,1-Dichloroethene	ND		0.5
1,1-Dichloroethane	ND		0.5
Trans-1,2-Dichloroethene	ND		0.5
Chloroform	ND		0.5
1,2-Dichloroethane	ND		0.5
2-Butanone	7.5		1.0
1,1,1-Trichloroethane	ND		0.5
Carbon Tetrachloride	ND		0.5
Vinyl acetate	ND		1.0
Bromodichloromethane	ND		0.5
1,2-Dichloropropane	ND		0.5
Cis-1,2-Dichloropropene	ND		0.5
Trichloroethene	ND		0.5
Benzene	ND		0.5
Dibromochloromethane	ND		0.5
Trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.5
Ethylene Dibromide	ND		0.5
2-Chloroethylvinylether	ND		1.0
Bromoform	ND		0.5
4-Methyl-2-Pentanone	ND		1.0
2-Hexanone	ND		1.0
Tetrachloroethene	ND		0.5
1,1,2,2,-Tetrachloroethane	ND		0.5
Toluene	ND		0.5
Chlorobenzene	ND		0.5
Ethylbenzene	ND		0.5
Styrene	ND		0.5
Total-Xylene	ND		0.5
M-Dichlorobenzene	ND		0.5
O&P-Dichlorobenzene	ND		0.5
Diacetone Alcohol	ND		1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES, INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	03
I.D.	Waste Line PT3
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	04
ID	Waste Line PT4
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration mg/kg	Detection Limit
Cyclohexanone	ND	1.0
Chloromethane	ND	1.0
Bromomethane	ND	1.0
Vinyl Chloride	ND	1.0
Chloroethane	ND	1.0
Methylene Chloride	ND	0.5
Acetone	ND	1.0
Carbon disulfide	ND	0.5
Trichlorofluoromethane	ND	0.5
1,1-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
Trans-1,2-Dichloroethene	ND	0.5
Chloroform	ND	0.5
1,2-Dichloroethane	ND	0.5
2-Butanone	7.7	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Vinyl acetate	ND	1.0
Bromodichloromethane	ND	0.5
1,2-Dichloropropane	ND	0.5
Cis-1,2-Dichloropropene	ND	0.5
Trichloroethene	ND	0.5
Benzene	ND	0.5
Dibromochloromethane	ND	0.5
Trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Ethylene Dibromide	ND	0.5
2-Chloroethylvinylether	ND	1.0
Bromoform	ND	0.5
4-Methyl-2-Pentanone	ND	1.0
2-Hexanone	ND	1.0
Tetrachloroethene	ND	0.5
1,1,2,2,-Tetrachloroethane	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
Styrene	ND	0.5
Total-Xylene	ND	0.5
M-Dichlorobenzene	ND	0.5
O&P-Dichlorobenzene	ND	0.5
Diacetone Alcohol	ND	1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	04
I.D.	Waste Line PT4
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	05
ID	Waste Line PT5
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration mg/kg	Detection Limit
Cyclohexanone	ND	1.0
Chloromethane	ND	1.0
Bromomethane	ND	1.0
Vinyl Chloride	ND	1.0
Chloroethane	ND	1.0
Methylene Chloride	ND	0.5
Acetone	2.8	1.0
Carbon disulfide	ND	0.5
Trichlorofluoromethane	ND	0.5
1,1-Dichloroethene	ND	0.5
1,1-Dichloroethane	ND	0.5
Trans-1,2-Dichloroethene	ND	0.5
Chloroform	ND	0.5
1,2-Dichloroethane	ND	0.5
2-Butanone	6.9	1.0
1,1,1-Trichloroethane	ND	0.5
Carbon Tetrachloride	ND	0.5
Vinyl acetate	ND	1.0
Bromodichloromethane	ND	0.5
1,2-Dichloropropane	ND	0.5
Cis-1,2-Dichloropropene	ND	0.5
Trichloroethene	ND	0.5
Benzene	ND	0.5
Dibromochloromethane	ND	0.5
Trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
Ethylene Dibromide	ND	0.5
2-Chloroethylvinylether	ND	1.0
Bromoform	ND	0.5
4-Methyl-2-Pentanone	ND	1.0
2-Hexanone	ND	1.0
Tetrachloroethene	ND	0.5
1,1,2,2,-Tetrachloroethane	ND	0.5
Toluene	ND	0.5
Chlorobenzene	ND	0.5
Ethylbenzene	ND	0.5
Styrene	ND	0.5
Total-Xylene	ND	0.5
M-Dichlorobenzene	ND	0.5
O&P-Dichlorobenzene	ND	0.5
Diacetone Alcohol	ND	1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	05
I.D.	Waste Line PT5
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

Volatile Organics Analysis

Sample No.	06
ID	Waste Line PT6
Date Sampled	5/25/89
Date Analyzed	6/08/89

Parameter	Concentration	mg/kg	Detection Limit
Cyclohexanone	ND		1.0
Chloromethane	ND		1.0
Bromomethane	ND		1.0
Vinyl Chloride	ND		1.0
Chloroethane	ND		1.0
Methylene Chloride	ND		0.5
Acetone	6.0		1.0
Carbon disulfide	ND		0.5
Trichlorofluoromethane	ND		0.5
1,1-Dichloroethene	ND		0.5
1,1-Dichloroethane	ND		0.5
Trans-1,2-Dichloroethene	ND		0.5
Chloroform	ND		0.5
1,2-Dichloroethane	ND		0.5
2-Butanone	2.2		1.0
1,1,1-Trichloroethane	ND		0.5
Carbon Tetrachloride	ND		0.5
Vinyl acetate	ND		1.0
Bromodichloromethane	ND		0.5
1,2-Dichloropropane	ND		0.5
Cis-1,2-Dichloropropene	ND		0.5
Trichloroethene	ND		0.5
Benzene	ND		0.5
Dibromochloromethane	ND		0.5
Trans-1,3-Dichloropropene	ND		0.5
1,1,2-Trichloroethane	ND		0.5
Ethylene Dibromide	ND		0.5
2-Chloroethylvinylether	ND		1.0
Bromoform	ND		0.5
4-Methyl-2-Pentanone	ND		1.0
2-Hexanone	ND		1.0
Tetrachloroethene	ND		0.5
1,1,2,2,-Tetrachloroethane	ND		0.5
Toluene	ND		0.5
Chlorobenzene	ND		0.5
Ethylbenzene	ND		0.5
Styrene	ND		0.5
Total-Xylene	ND		0.5
M-Dichlorobenzene	ND		0.5
O&P-Dichlorobenzene	ND		0.5
Diacetone Alcohol	ND		1.0

Note: ND = Not Detected

GTEL ENVIRONMENTAL LABORATORIES INC

Report No.
302-000-8684

Work Order No.
M9-05-641

VOLATILE ORGANICS ANALYSIS

TENTATIVELY IDENTIFIED COMPOUNDS

Sample No.	06
I.D.	Waste Line PT6
Date Sampled	5/25/89
Date Analyzed	6/08/89

Compound Name	Estimated Conc. mg/kg
None Detected	

GTEL ENVIRONMENTAL LABORATORIES INC

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LABORATORIES, INC.

Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

TO: Mr. Ray Fenstermacher
Project Manager, GTI Chadds Ford
FROM: Lois Luniewicz
QA Liaison, GTEL Milford
DATE November 17, 1989
RE: 302-000-8684
M9-05-641

The time in which these two analyses occurred was one in which stocks of methanol, the extraction fluid for 8240 soils analysis, were frequently contaminated with 2-butanone. Although this is not unusual, the levels found were uncommonly high. After a period of investigation, we began purchasing solvents from a new supplier. These stocks have been virtually free of 2-butanone contamination.

Due to the fact that these contaminants do commonly appear and need to be accounted for in a standard analytical report, it is GTEL's policy to blank subtract the contaminants found in the method blank from all the associated samples. Typically there is some variation in the analysis from day to day and from sample to sample such that the samples will not have the same value as the blank, but the levels will not differ significantly. After blank subtraction the net blank contribution of common contaminants is negligible.

These samples show this typical variation. However, due to the magnitude of the contamination problem at the time, the residual sample amount after blank subtraction is large enough to be quantitated.

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ENVIRONMENTAL
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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8684

Work Order No.
M9-05-643

Laboratory Test Results

6/09/89
Submitted To:

Ray Fenstermacher
Groundwater Technology
U.S. Route 1
Concord Building
Chadds Ford, PA 19317

Sample Identification:

The attached report covers 6 soil samples collected by J.M. on 5/25/89 from site # 302-000-8684-(04), Hazelton, Pennsylvania.

Analyst:

Samples were analyzed by A. Naber, S. Theriault, and R. Bosshart.

Method:

The samples were prepared and analyzed for heavy metals by ICP emission spectroscopy, EPA Method 6010, and for Mercury by cold vapor AA, EPA Method 7470. Arsenic and Selenium were determined by graphite furnace AA spectrophotometry, EPA Methods 7060 and 7740, respectively.

Method Reference: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, November 1986.

Results:

The results are reported in mg/kg (ppm) on a dry basis and are shown in Table 1.

Respectfully submitted,

Susan C. Uhler
Laboratory Director

CC: Joe McCarthy
486 S. Mt. Blvd.
Mt. Top, PA 18707

Report No.
302-000-8684

Work Order No.
M9-05-643

Table 1

INORGANIC ANALYTICAL RESULTS

Priority Pollutant Metals in Soil, mg/kg

GTEL No. Client ID.	04 WASTELINE POINT 4	05 WASTELINE POINT 5	06 WASTELINE POINT 6	Detection Limit
Element				
Antimony	< 24	< 24	< 24	24
Arsenic	2.4	2.6	1.4	1.0
Beryllium	< 1.0	< 1.0	< 1.0	1.0
Cadmium	< 1.2	< 1.2	< 1.2	1.2
Chromium	8.1	13	8.8	2.8
Copper	15	15	5.7	2.5
Lead	28	30	25	24
Mercury	0.06	0.06	< 0.05	0.05
Nickel	13	17	9.9	4.0
Selenium	< 1.0	< 1.0	< 1.0	1.0
Silver	< 1.0	< 1.0	< 1.0	1.0
Thallium	< 36	< 36	< 36	36
Zinc	84	280	23	2.0

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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8684

Work Order No.
M9-05-642

Laboratory Test Results

6/20/89
Submitted To:

Ray Fenstermacher
Groundwater Technology
U.S. Route 1
Concord Building
Chadds Ford, PA 19317

Sample Identification:

The attached report covers 2 soil samples collected by J.P.M., on 5/25/89 from site # 302-000-8684-(04), Hazelton, Pennslyvania. setts.

Analysts:

Samples were extracted by C. Berry and analyzed by A. Naber, R. Bosshart and S. Theriault.

Method:

The samples were extracted for Extraction Procedure Toxicity (EP TOX) as per EPA Method 1310. The extract was prepared and analyzed for heavy metals by ICP emission spectroscopy, EPA Method 6010, and for mercury by cold vapor AA, EPA Method 7470. Arsenic and Selenium were determined by graphite furnace AA spectrophotometry, EPA Methods 7060 and 7740, respectively.

Method Reference: Test Methods for Evaluating Solid Waste, SW-846, 3rd edition, November 1986.

Results:

The results are reported in mg/L (ppm) in the extract and are shown in Table 1.

Respectfully submitted,

Susan C. Uhler
Laboratory Director

CC: Joe McCarthy
486 South Mt. Blvd.
Mt. Top, PA 18707

Report No.
302-000-8684

Work Order No.
M9-05-642

Table 1

Metals in EP Toxicity Extract, mg/L

GTEL No. Client ID. Element	01 WASTE LINE POINT 1	02 WASTE LINE POINT 4	Reporting Limits
Arsenic	< 0.005	< 0.005	0.005
Barium	< 40	< 40	40
Cadmium	< 0.40	< 0.40	0.40
Chromium	< 2.0	< 2.0	2.0
Lead	< 2.0	< 2.0	2.0
Mercury	< 0.0005	< 0.0005	0.0005
Selenium	< 0.005	< 0.005	0.005
Silver	< 2.0	< 2.0	2.0

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Northeast Region
Meadowbrook Industrial Park
Milford, NH 03055
(603) 672-4835
(603) 673-8105 (FAX)

Report No.
302-000-8684

Work Order No.
M9-05-632

5/31/89
Submitted To:

Ray Fenstermacher
Groundwater Technology
U.S. Route 1
Concord Building
Chadds Ford, PA 19317

Sample Identification:

The attached report covers 2 soil samples collected by J.P.M. on 5/25/89 from site # 302-000-8684, Hazelton, Pennsylvania.

Analyst:

Analyses were performed by A. Naber on 5/26/89.

Method:

The samples were analyzed for pH using EPA Method 9045.

Method Reference: Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition, November 1986.

Results:

The results are reported in pH units and are shown in Table 1.

Respectfully submitted,
Jennifer A. Williams
for Susan C. Uhler
Susan C. Uhler
Laboratory Director

cc: Joe McCarthy
GTI
486 S. Mt. Blvd.
Mt. Top, PA 18707

Report No.
302-000-8684

Work Order No.
M9-05-632

Table 1

pH

GTEL Sample No.	Client I.D.	pH (pH units)
01	WASTE LINE POINT 3	6.9
02	WASTE LINE POINT 6	6.1

GTEL ENVIRONMENTAL LABORATORIES INC.

GTEL Environmental Laboratories, Inc.

Meadowbrook Industrial Park
Milford, New Hampshire 03055
(603) 672-4835

CHAIN-OF-CUSTODY RECORD AND ANALYSIS REQUEST

No. 16756

Project Manager: Ray Festermacher
Phone #: 215-368-1466
Address (Office): Chadds Ford
Site Location: Hazelton
Project Number: 3ol-eco-8684-04
Project Name: Cost White Cap
I attest that the proper field sampling procedures were used during the collection of these samples
Sampler Name (Print): Joseph R. McCarthy

Field Sample ID	Source of Sample	GTEL Lab # (Lab use only)	# Containers	Matrix: Water	Matrix: Soil	Matrix: Air	Matrix: Sludge	Matrix: Other	Preserved: HCl	Preserved: HNO_3	Preserved: H_2SO_4	Preserved: Ice	Preserved: None	Preserved: Other	Sampling Date	Sampling Time
fence line Point 1			3		X							X			5/15	12:30
fence line Point 2			3		X							X			"	1:00
fence line Point 3			3		X							X			"	1:30
fence line Point 4			3		X							X			"	2:00
fence line Point 5			3		X							X			"	2:30
fence line Point 6	Background		3		X							X			"	3:00

ANALYSIS REQUEST

Field Sample ID	Gas. Hydrocarbons by 8015 ☐ 8020 ☐ KS ☐ with MTBE ☐	BTEX only by 602 ☐ 8020 ☐ with MTBE ☐	MTBE only by 602 ☐ 8020 ☐	EDB by 504	Oil and Grease 413.1 ☐ 413.2 ☐ 503B+E ☐	Petroleum Hydrocarbons 418.1 ☐ 503D-E ☐	EPA 503.1 ☐ 502.2 ☐	EPA 601 ☐ 8010 ☐ DCA only ☐	EPA 602 ☐ 8020 ☐	EPA 608 ☐ 8080 ☐	EPA 608 PCB only ☐ 8080 PCB only ☐	EPA 624 ☐ 8240 NBS	EPA 625 ☐ 8270 ☐ NBS ☐	EPA 625 BN only ☐ 8270 BN only ☐ NBS ☐	EPA 625 AE only ☐ 8270 AE only ☐ NBS ☐	EPA 610 ☐ 8310 ☐	EPTOX - 8 Metals / Waste characteristics	EPA - Priority Pollutant Metals	LEAD 239.2 ☐ 7421 ☐ 200.7 ☐ 6010 ☐	TCLP - Metals	TCLP VOA ☐ Semi VOA ☐	Other: pH / Hard	Other	Other
Point 1												X					X	X				[illegible]		
Point 2												X						X				[illegible]		
Point 3												X						X				X		
Point 4												X					X	X				X		
Point 5												X						X				X		
Point 6												X						X				X		

CUSTODY RECORD

Waybill # 2087 180

Relinquished by	Date	Time	Received by
Relinquished by Sampler: [signature]	5/15/89	5:00	Received by: Federal Express
Relinquished by:	Date	Time	Received by:
Relinquished by:	5/16/89	11:45	Received by Laboratory: [signature]

SPECIAL HANDLING

PRIORITY ONE (24 hrs) ☐
EXPEDITED (2-4 days) ☐
QA/QC Red Level ☐ Blue Level ☐
VERBAL ☐ FAX ☐

SPECIAL DETECTION LIMITS (Specify)

SPECIAL REPORTING REQUIREMENTS (Specify)
Please Send Copy of Report to Both Proj. Manager + MT. Tel. Office
ATTN: Joe McCarthy

REMARKS:
→ Note: Purgeable Volatiles Plus 0.10
Cyclohexanone + Diacetone Alcohol
(Quantify any unknown Peaks)
method EPA 8240
LOT #4384

ORIGINAL (Red)

Groundwater Seepage Velocity — MW-4

* estimated in range
* i = .018 ft/ft
* K = .013 gal/day/ft^2
* n = 5 to 30%

$V_s = \frac{Ki}{n}$

K = hydraulic conductivity
i = hydraulic gradient
n = effective porosity

* porosity range is estimated at 5 to 30%

$$V_s = \frac{(.013 \text{ gal/day/ft}^2)(.018 \text{ ft/ft})}{(.05) \text{ to } (.30)} \times \frac{\text{ft}^3}{7.48 \text{ gal}}$$

$$V_s = \frac{2.34 \times 10^{-4}}{(.374) \text{ to } (2.24)} \text{ ft/day}$$

$$V_s = 6.3 \times 10^{-4} \text{ to } 1 \times 10^{-4}$$

$$V_s = 6.3 \times 10^{-4} \text{ to } .1 \times 10^{-4} \text{ ft/day} \times 365 \text{ days/year}$$

$$V_s = 0.23 \text{ to } .038 \text{ ft/year}$$

ORIGINAL (Red)

Slug Test Data MW-4 HVORSLEV METHOD

SEPTEMBER 20, 21, 1

$$K = \frac{r^2 \ln(L/R)}{2 L T_0}$$

$$K = \frac{(.21\ ft)^2 \ln(25.72'/.21\ ft)}{(2)(25.72\ ft)(205{,}000\ sec)}$$

$$K = \frac{(.044\ ft^2)(\ln[122.48])}{10{,}545{,}200\ ft\text{-}sec} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ g}{ft^3}$$

$$K = \frac{136{,}718}{10{,}545{,}200} \quad gal/day/ft^2$$

$$K = .013\ gal/day/ft^2$$

Slug Test Data MW-1 Hydrogeologic Test September 20-21, 1989

$$T = \frac{W r^2}{t}$$

$$T = \frac{(10^{-1})(.21\ ft)^2}{11{,}000\ sec} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gal.}{ft^3}$$

$$T = \frac{28{,}555}{11{,}000} \times 10^{-1}\ gal/day/ft$$

$$\boxed{T = 2.59 \times 10^{-1}\ gal/day/ft}$$

$T = Kb \quad \therefore \quad b = T/K$

where b = the saturated thickness of the aquifer.

$$b = \frac{.254\ gal/day/ft}{.013\ gal/day/ft^2}$$

$$\boxed{b = 19.90\ ft}$$

$S = \alpha \cdot r_c^2 / r_s^2$

$S = 10^{-5} \frac{(.25\ ft)^2}{(.21\ ft)^2}$

$S = \frac{.0625}{.04} \times 10^{-5}$

$$\boxed{S = 1.48 \times 10^{-5}}$$

ORIGINAL (Red)

Effective radius of well MW-4

$V = \pi r^2 h$

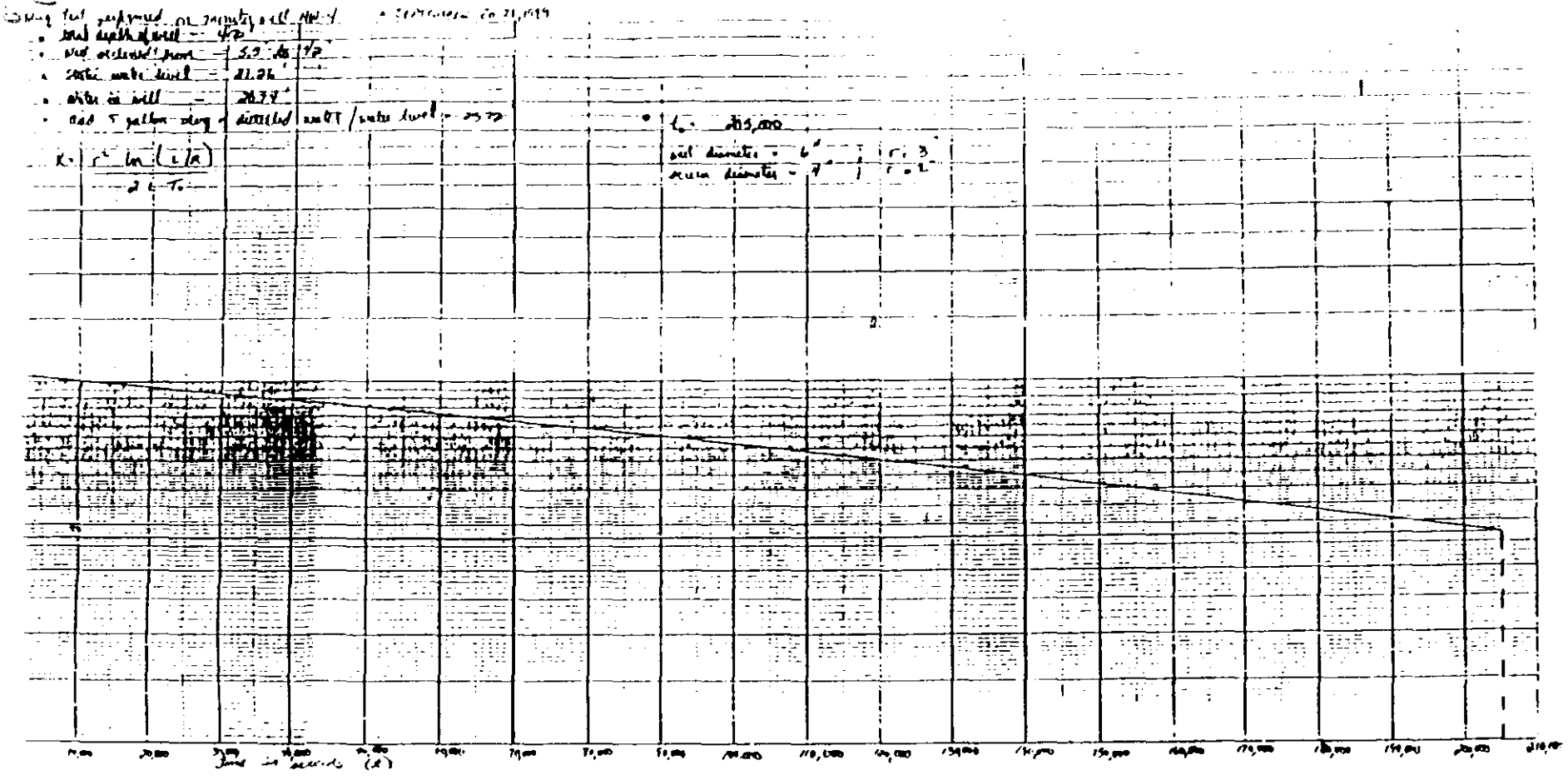
$r^2 = \frac{V}{\pi h}$

$r^2 = \frac{5 \text{ gallons}}{(3.14)(4.97 \text{ feet})} \times \frac{ft^3}{7.48 \text{ gallons}}$

$r^2 = \frac{5 \, ft^2}{116.97}$

$r = \sqrt{.043 \, ft^2}$

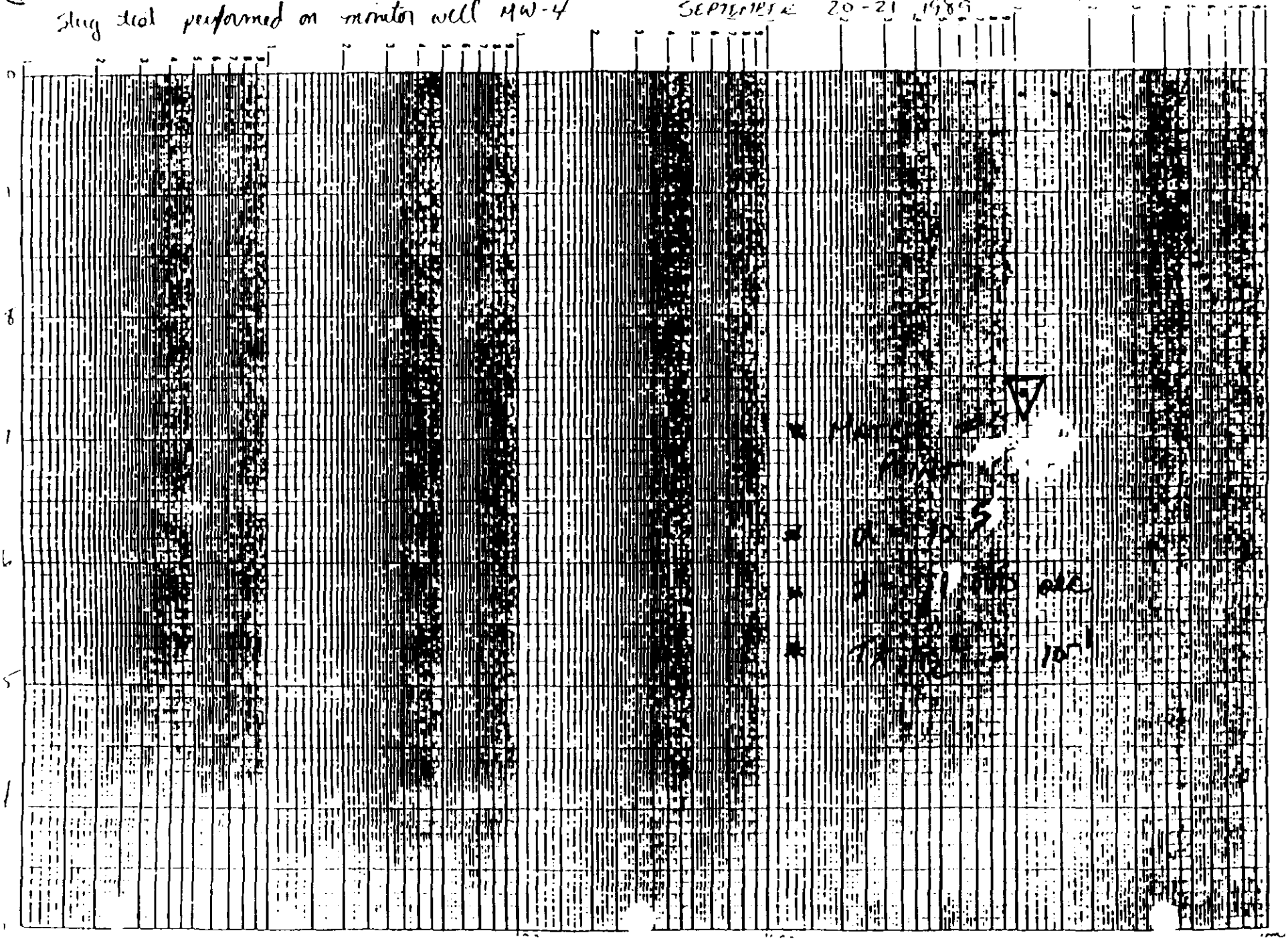
$r = .21 \text{ feet}$



ORIGINAL (Red)

PAPADOPULOS METHOD

Slug test performed on monitor well MW-4 SEPTEMBER 20-21 1989



AR100924

ORIGINAL (Red) 25

Monitor Well [illegible]

Slug Test Data

Static water level = 21.36

Time	H	ΔH	H/Ho	time (sec.)
12:07:45	rising head	—	—	—
12:09:30		—	—	105
12:11:15		—	—	210
12:13:45		—	—	360
12:14:15		—	—	390
12:16:00		—	—	495
12:28:00		—	—	720
12:51:00		—	—	2,760
13:00:00		—	—	3,300
13:32:00	↓	—	—	6,365
13:33:00	4.98	—	—	6,425
13:34:00		4.95	.99	6,485
13:35:00		4.92	.99	6,545
14:04:00		4.89	.95	10,525
15:40:30		4.86	.95	14,115
16:15:00		4.83	.97	16,215
17:15:00		4.80	.92	27,015
19:30:00		4.74	.95	27,915
19:45:00		4.71	.95	28,815
20:00:00		4.65	.94	29,715
20:15:00		4.59	.92	30,615
20:45:00		4.56	.93	32,415
21:15:00		4.53	.91	34,215
21:45:00		4.50	.93	36,015
22:00:00		4.47	.90	36,915
22:15:00		4.44	.89	37,815
		4.41	.89	39,615

AR100925

ORIGINAL
(Red)

time	H	ΔH	H/H₀	t (sec)
23:30:00	4.98	4.38	.88	42,315
30:00		4.32	.87	45,915
1:00:00		4.29	.86	47,715
1:45:00		4.26	.86	50,415
2:15:00		4.23	.85	52,215
2:30:00		4.20	.84	53,115
3:00:00		4.17	.84	54,915
3:15:00		4.14	.83	55,815
3:45:00		4.11	.83	57,615
4:00:00		4.08	.82	58,515
4:30:00		4.05	.81	60,315
5:00:00	↓	4.02	.81	62,115

AR100926

ORIGINAL (Red)

Groundwater Seepage Velocity

MW-6

- estimated in range

- i = .10 ft/ft
- K = .726 gal/day/ft²
- n = 5 to 30%

where

i = hydraulic gradient
K = hydraulic conductivity
n = effective porosity

- porosity range estimated to be 5 to 30%.

$$V_s = \frac{Ki}{n}$$

$$V_s = \frac{(.726 \text{ gal/day/ft}^2)(.10 \text{ ft/ft})}{(.05) \text{ to } (.30)} \times \frac{\text{ft}^3}{7.48 \text{ gallons}}$$

$$V_s = \frac{.073}{(.374) \text{ to } (2.24)} \text{ ft/day}$$

V_s = .195 ft/day to .033 ft/day

V_s = .195 ft/day to .033 ft/day × 365 days/year

V_s = 71.2 ft/year 11.89 ft/year

Slug Test Data — MW-6 — BOUWER METHOD — Sept Tested 21-21, 1989

$$K = \frac{r^2 \ln(L/R)}{2 L t_0}$$

$$K = \frac{(.24\ ft)^2 \ln(16.27'/.24\ ft)}{(2)(16.27\ ft)(6{,}700\ sec)}$$

$$K = \frac{(.058\ ft^2)(4.22)}{218{,}018\ ft \cdot sec} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gal}{ft^3}$$

$$K = \frac{157{,}181}{218{,}018}\ gallons/day/ft^2$$

$$K = .726\ gal/day/ft^2$$

ORIGINAL (Red)

Slug Test Data MW-6 Papadopulos Method
September 20-21, 1989

$$T = \frac{Wr^2}{t}$$

$$T = \frac{(1.0)(.24\ ft)^2}{1,155\ sec} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gal}{ft^3}$$

$$T = \frac{37,225}{1,100} \quad gal/day/ft$$

$$T = 33.84\ gal/day/ft$$

$$S = \alpha\, r_c^2 / r_s^2$$

$$S = 10^{-5} \frac{(.25\ ft)^2}{(.24\ ft)^2}$$

$$S = 1.09 \times 10^{-5}$$

$$T = Kb \quad \therefore \quad b = T/K$$

where b is the saturated thickness of the aquifer

$$b = \frac{33.84\ gal/day/ft}{.726\ gal/day/ft^2}$$

$$b = 46.61\ ft$$

Effective Well Radius MW-6

$V = \pi r^2 h$

$r^2 = \frac{V}{\pi h}$

$r^2 = \frac{5 \text{ gallons}}{(3.14)(3.63 \text{ ft})} \times \frac{\text{ft}^3}{7.48 \text{ gallons}}$

$r^2 = \frac{5}{85.26} \text{ ft}^2$

$r^2 = .0586 \text{ ft}^2$

$r = \sqrt{.0586 \text{ ft}^2}$

$\boxed{r = .24 \text{ ft}}$

ORIGINAL

Slug test performed on monitor well MW-6 * September 20-21, 1990

* Total depth of well = 40 feet
* Well screened from = 5' to 40'
* Static water level = 27.36'
* Water on well = 12.64'
* Add 5 gallon slug of distilled water / water level = 16.27
* Head differential = 3.63 feet

$$K = \frac{r^2 \ln(L/R)}{2 L t_o}$$

t_o = 6,700 seconds

.37 ← t_o

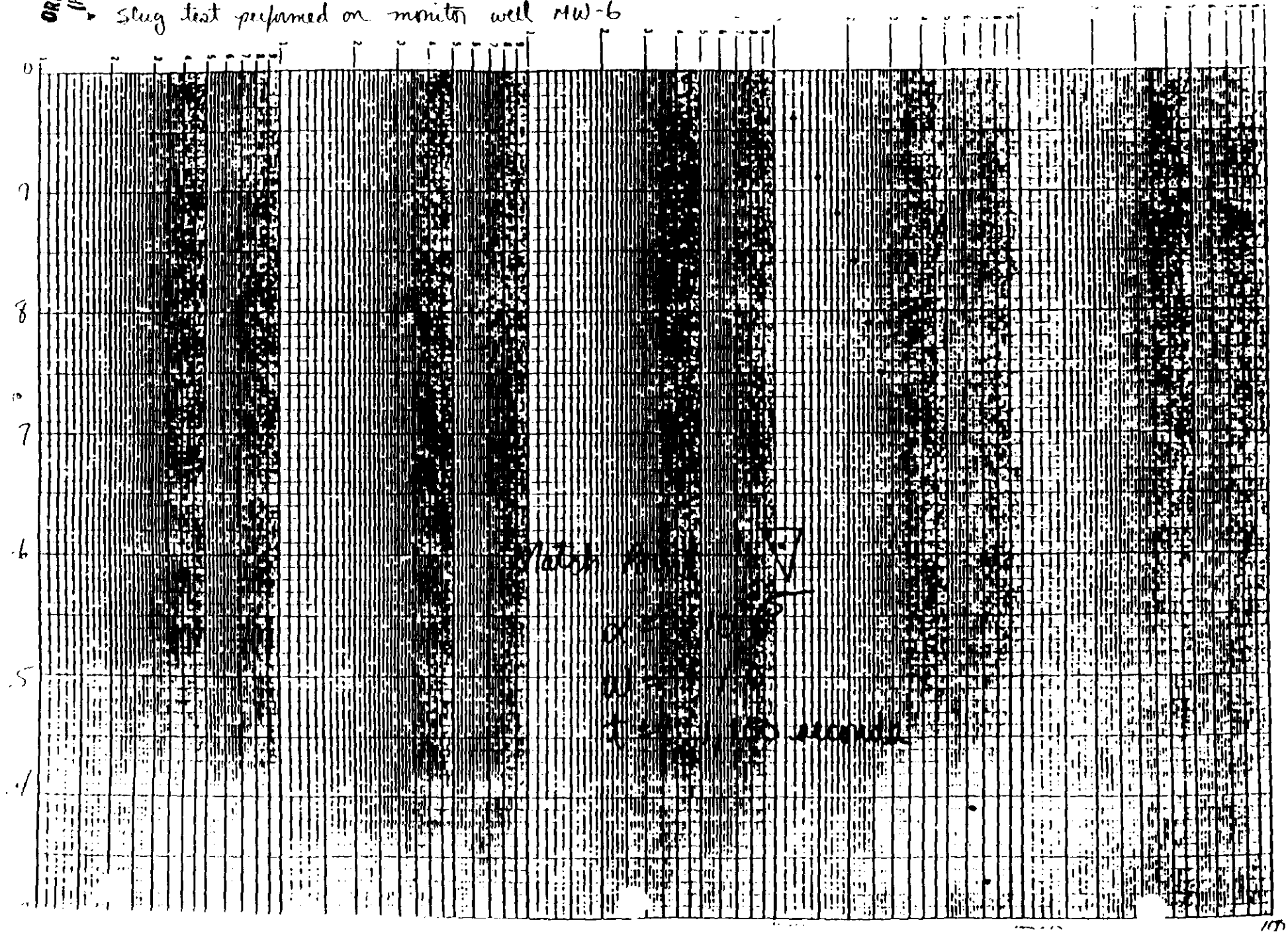
1,000 2000 3,000 4,000 5,000

AR100931

ORIGINAL (Red)

PAPADOPULOS METHOD

- Slug test performed on monitor well MW-6



Slug Test Data [illegible] — Static Water Level 27.[illegible] (Rod)

FINAL AR100933

time	H	ΔH	H/Ho	t (sec)
12:45:00	—	—	—	begin test
12:45:30	rising head			30
12:46:00				60
46:30				90
12:47:00				120
47:30				150
12:48:00				180
48:30				210
12:49:00				240
49:30				270
12:50:00				300
:51:00				360
12:52:00				420
12:53:00				480
12:54:00				540
12:55:00				600
[illegible]				660
12:57:00	3.63	—	—	720
12:58:00		3.62	.99	780
12:59:00		3.60	.99	840
13:00:00		3.58	.99	900
13:05:00		3.47	.96	1200
13:10:00		3.29	.91	1500
13:15:00		3.18	.88	1800
13:20:00		3.03	.84	2100
13:25:00		2.87	.79	2400
13:30:00		2.75	.75	2700

[illegible]

ORIGINAL (Red)

Survey	ht	DH	H/H₀	t (sec)
13:35:00	3.63	2.58	.71	3,000
13:45:00		2.45	.68	3,300
13:45:00		2.36	.65	3,600
13:55:00		2.12	.58	4,200
14:05:00		1.91	.53	4,800
14:15:00		1.71	.47	5,400
14:30:00		1.42	.39	6,300
14:45:00		1.20	.33	7,200
15:00:00		1.02	.28	8,100
15:15:00		.85	.23	9,000
15:30:00		.73	.20	9,900
15:45:00		.60	.17	10,800
16:15:00		.41	.11	11,700
16:45:00		.32	.09	16,450

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

LIQUID LEVEL MEASUREMENTS ORIG.
CLIENT: Continental Whitecap
LOCATION: MW/60
DATE: 20-21 Sept. 1994

LIQUID LEVELS IN WELLS DURING SLUG TEST

Time Elapsed	DTW	Comments		Time Elapsed	DTW	Comments
Static	22.38	At 12:45		20 min	23.91	5 min. Readings
.5 min	25.80	After + 5 gal. Distilled		25	24.09	
1	25.55			30	24.20	
1.5	25.27			35	24.35	
2	24.91			40	24.51	
2.5	24.65			45	24.66	
3	24.44			50	24.80	
3.5	24.28			55	24.93	
4	24.16			60	25.02	10 min. Readings
4.5	24.07			70	25.20	
5	23.99			80	25.47	
6	23.90	1 min Readings		90	25.67	
7	23.83			105	25.96	15 min. Readings
8	23.81			120	26.18	
9	23.77			135	26.36	
10	23.75			150	26.53	
11	23.75			165	26.65	
12	23.75			180	26.78	
13	23.76	Began to fall		210	26.97	30 min. Readings
14	23.75			228	27.06	Taken at 16:35 (1st min. Reading)
15	23.80			1153	27.52	Taken at 8:30 End of Test

ORIGINAL (Red)

Groundwater seepage velocity — MW-8

* estimated in ranges

* i = .019
* K = .623 gal/day/ft²
* n = 5 to 30%

$$V_s = \frac{Ki}{n}$$

i = hydraulic gradient
K = hydraulic conductivity
n = effective porosity
* porosity is estimated at 5 to 30%

$$V_s = \frac{(.623 \text{ gal/day/ft}^2)(.019 \text{ ft/ft})}{(.05) \text{ to } (.30)} \times \frac{\text{ft}^3}{7.48 \text{ gallons}}$$

$$V_s = \frac{.012}{.374 \text{ to } 2.24} \text{ ft/day}$$

V_s = .032 ft/day to .0054 ft/day

V_s = .032 ft/day to .0054 ft/day × 365 days/year

V_s = 11.68 ft/year to 1.97 ft/year

Slug Test Data MW-8 HVORSLEV METHOD

September 20-21, 1989

$$K = \frac{r^2 \ln(L/R)}{2 L t_0}$$

$$K = \frac{(.27\ ft)^2 (\ln[20.96'/.27\ ft])}{(2)(20.96\ ft)(7{,}750\ seconds)}$$

$$K = \frac{(.072\ ft^2)(4.35)}{324{,}880\ ft \cdot sec.} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gallons}{ft^3}$$

$$K = \frac{28{,}412}{324{,}880}\ gal/day/ft^2$$

$$K = .623\ gal/day/ft^2$$

Slug Test Data MW-8 Papadopulos Tilton
September 20-21, 1989

$$T = \frac{W r^2}{t}$$

$$T = \frac{(1.0)(.27\ ft)^2}{1{,}500\ seconds} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gal}{ft^3}$$

$$T = \frac{47{,}113}{1{,}500}\ gal/day/ft$$

$$\boxed{T = 31.4\ gallons/day/ft}$$

$T = Kb \quad \therefore \quad b = T/K$

where b is the saturated thickness of the aquifer

$$b = \frac{31.4\ gal/day/ft}{.623\ gal/day/ft^2}$$

$$\boxed{b = 50.42\ feet}$$

$S = x\ r_c^2\ r_s^2$

$S = 10^{-5}\ \frac{(.25\ ft)^2}{(.27\ ft)^2}$

$S = \frac{.0625}{.0729} \times 10^{-5}$

$$\boxed{S = 8.5 \times 10^{-6}}$$

Effective well Radius — MW-8

$V = \pi r^2 h$

$r^2 = \frac{V}{\pi h}$

$r^2 = \frac{5 \text{ gallons}}{(3.14)(2.95 \text{ feet})} \times \frac{ft^3}{7.48 \text{ gallons}}$

$r^2 = \frac{5}{69.29} ft^2$

$r = \sqrt{.072 \; ft^2}$

$\boxed{r = .27 \text{ feet}}$

ORIGINAL

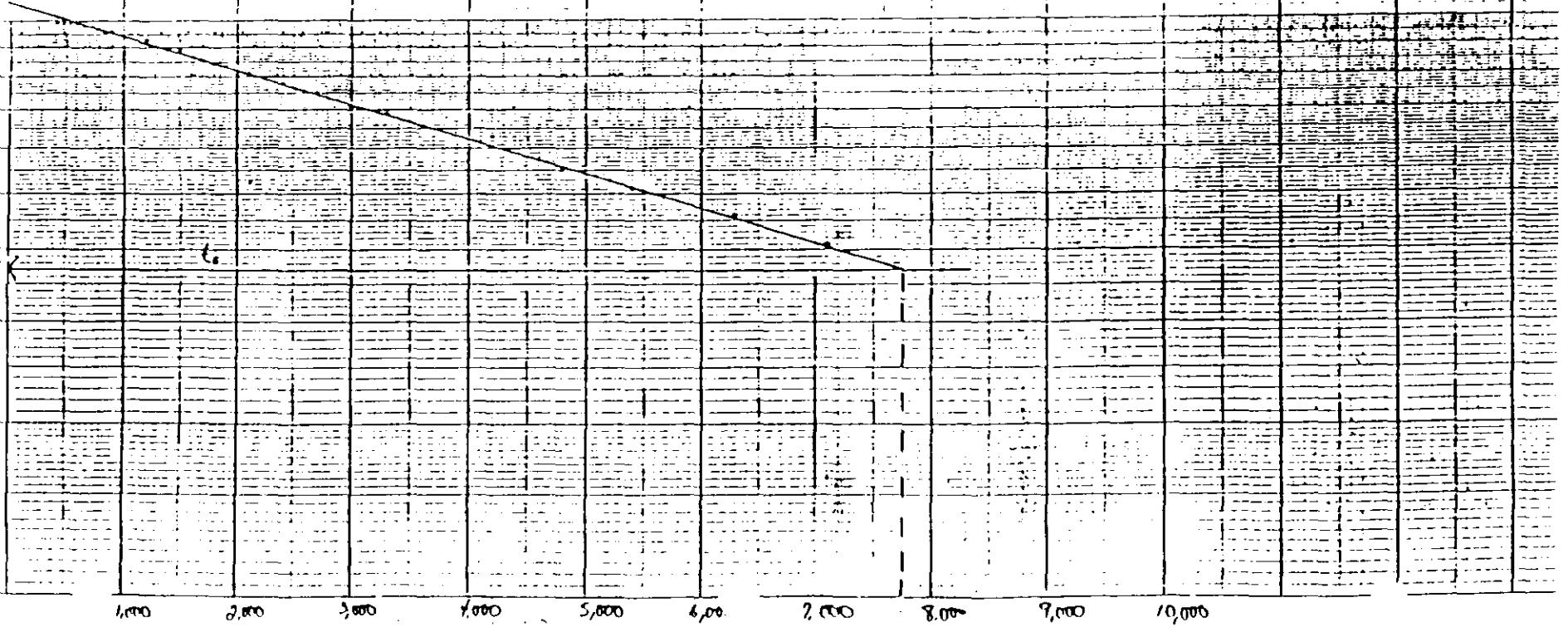
HVORSLEV METHOD

Slug test performed on monitor well MW-6 • September 20-21, 1989

- Total depth of well = 50'
- Well screened from = 10 - 40'
- Static water level = 21.99
- Water in well within screened interval = 18.01
- Add 5 gallon of distilled water / water level = 20.96

$$K = \frac{r^2 \ln(L/Re)}{2 L t_0}$$

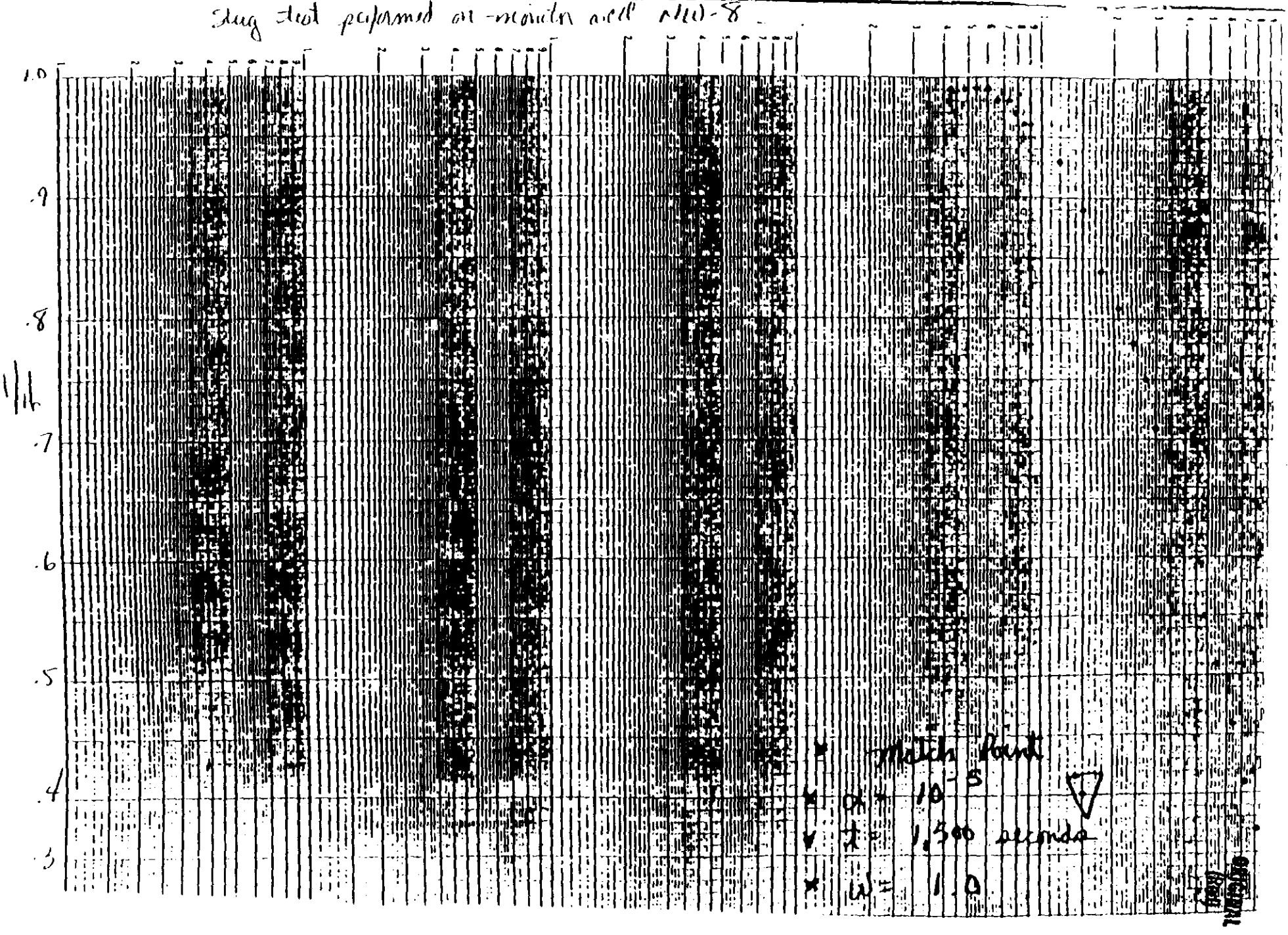
- t_0 = 7.7.50 seconds
- well diameter = 6"
- screen diameter = 4"



AR100940

PAPADOPOULOS METHOD

Slug test performed on monitor well MW-8



Slug Test Data for Monitor Well MW-8 - 5 gallons distilled

Static Water Level. 21.89'

ORIGINAL (Red)

Time	H	ΔH	H/Ho	t (sec)
14:19:00	rising head	—	—	begin test
19:30		—	—	30
14:20:00		—	—	60
20:30		—	—	90
14:21:00		—	—	120
21:30		—	—	150
14:22:00		—	—	180
22:30		—	—	210
14:23:00		—	—	240
23:30		—	—	270
14:24:00	—	—	—	300 *
14:25:00	2.25			360
14:26:00		[illegible]	.99	420
14:27:00		2.94	.99?	480
14:28:00		2.93	.99	540
14:29:00		2.96	.99	600
14:30:00?		[illegible]	.95?	660?
14:31:00?		2.89	.99	720?
14:32:00		2.87	.97	780?
14:33:00		2.84	.96	840?
14:34:00		2.83	.96	900
14:39:00		2.75	.93	1200
14:44:00		2.61	[illegible]	1500?
14:49:00		2.49	[illegible]	1800?
14:54:00		2.39	.81	2100
14:59:00		2.29	.78	2400
15:04:00	↓	2.20	.75	2700

* [illegible]

AR100942

ORIGINAL (Red)

time	H	ΔH	H/Hₒ	ft/sec)
15:09:00	2.95	2.10	.71	3,000
15:14:00		2.02	.69	3,300
15:19:00		2.03	.69	3,600
15:29:00		1.87	.63	4,200
15:39:00		1.63	.55	4,800
15:49:00		1.51	.51	5,400
16:04:00		1.35	.46	6,300
16:19:00		1.21	.41	7,200
16:34:00	↓	1.09	.37	8,100

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental Whitecap
LOCATION: MW-8
DATE: 20-21 Sept. 1989

ORIGINAL (Red)

LIQUID LEVELS IN WELLS DURING SLUG TEST

Time Elapsed	DTW	Comments		Time Elapsed	DTW	Comments
Static	21.89	At 14:19		20 min.	19.14	5 min. Readings
.5 min.	19.28	After + 5 gal Dumped		25	19.28	
1	19.14			30	19.40	
1.5	19.10			35	19.50	
2	19.04			40	19.60	
2.5	19.00			45	19.69	
3	18.98			50	19.79	
3.5	18.97			55	19.87	
4	18.96			60	19.86	10 min Readings
4.5	18.95			70	20.02	
5	18.95			80	20.26	
6	18.94	1 min. Readings		90	20.38	
7	18.95	Began to fall		105	20.54	15 min Readings
8	18.95			120	20.64	
9	18.96			135	20.80	Taken at 16:35
10	18.97			1183	21.11	Taken at 8:50 End of Test
11	18.99					
12	19.00					
13	19.02					
14	19.05					
15	19.06					

Groundwater Seepage Velocity

* estimated site conditions

MW-20

* $i = .019$
  $K = .279$ gal/day/ft²
  $n = 5$ to 30%

where
i = hydraulic gradient
K = hydraulic conductivity
n = effective porosity
* porosity values estimated
  as 5 to 30%

$$V_s = \frac{Ki}{n}$$

$$V_s = \frac{(.279 \text{ gallons/day/ft}^2)(.019 \text{ ft/ft})}{(.05) \text{ to } (.30)} \times \frac{\text{ft}^3}{7.48 \text{ gal}}$$

$$V_s = \frac{5.3 \times 10^{-3}}{(.374) \text{ to } (2.24)} = \text{ ft/day}$$

$$V_s = 1.42 \times 10^{-2} \text{ ft/day to } 2.37 \times 10^{-3} \text{ ft/day}$$

$$V_s = 1.42 \times 10^{-2} \text{ to } 2.37 \times 10^{-3} \text{ ft/day} \times 365 \text{ days/year}$$

$$V_s = 5.18 \text{ ft/year to } .865 \text{ ft/year}$$

ORIGINAL
(Red)

Slug Test data MW-20 HVORSLEV METHOD

SEPTEMBER 20-21, 1

$$K = \frac{r^2 \ln(L/R)}{2 L t_0}$$

$$K = \frac{(.24\ ft)^2 \left(\ln[33.99'/.24\ ft]\right)}{2(33.99\ ft)(9.775\ sec)}$$

$$K = \frac{(.058\ ft^2)(4.95)}{664.505\ ft\text{-}sec} \times \frac{60\ sec}{min} \times \frac{1440\ min}{day} \times \frac{7.48\ gal}{ft^3}$$

$$K = \frac{185.545}{664.505}\ gal/day/ft^2$$

$$K = .279\ gal/day/ft^2$$

Elmo Test Data

PAPADOPULOS METHOD
September 20-21, 1954

$$T = \frac{w r^2}{t}$$

$$T = \frac{(1.0)(.64\,ft)^2}{3{,}500\ \text{seconds}} \times \frac{60\ \text{sec}}{\text{min}} \times \frac{1440\ \text{min}}{\text{day}} \times \frac{7.48\ \text{gal}}{ft^3}$$

$$T = \frac{37{,}225}{3{,}500} \quad \text{gal/day/ft}$$

$$\boxed{T = 10.64\ \text{gal/day/ft}}$$

$$T = Kb \qquad \therefore \qquad b = T/K$$

where b is the saturated thickness of the aquifer

$$b = \frac{10.64\ \text{gal/day/ft}}{.279\ \text{gal/day/ft}^2}$$

$$\boxed{b = 38.1\ \text{feet}}$$

$$S = \alpha\, r_c^2 / r_3^2$$

$$S = \frac{10^{-5}\,(.25\,ft)^2}{-}$$

$$S = \frac{\quad}{\quad}$$

$$\boxed{S = 1.02 \times 10^{-5}}$$

ORIGINAL (Red)

Effective well radius MW-20

$V = \pi r^2 h$

$r^2 = \frac{V}{\pi h}$

$r^2 = \frac{5 \text{ gallons}}{(3.14)(5.40 \text{ feet})} \times \frac{ft^3}{7.48 \text{ gallons}}$

$r^2 = \frac{5 \quad ft^2}{80.33}$

$r = \sqrt{.062 \, ft^2} =$

$\boxed{r = .24 \text{ ft}}$

Slug test performed on month well (MW-20 — September 20-21, 1999

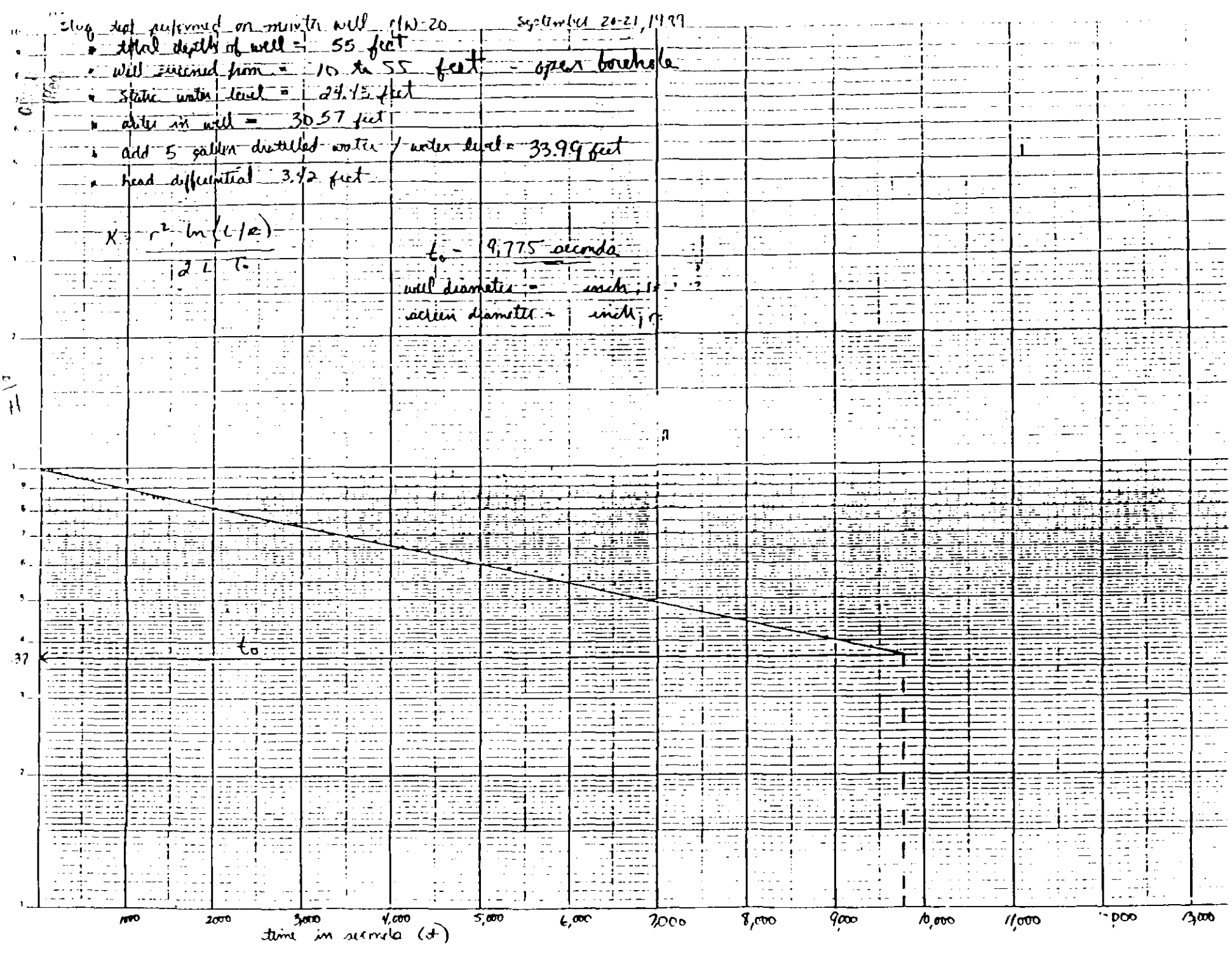
- total depth of well = 55 feet
- well screened from = 10 to 55 feet = open borehole
- static water level = 24.15 feet
- water in well = 30.57 feet
- add 5 gallons distilled water / water level = 33.99 feet
- head differential 3.42 feet

$$K = \frac{r^2 \ln(L/R)}{2L\, t_0}$$

t_0 = 9,775 seconds

well diameter = inch; r =

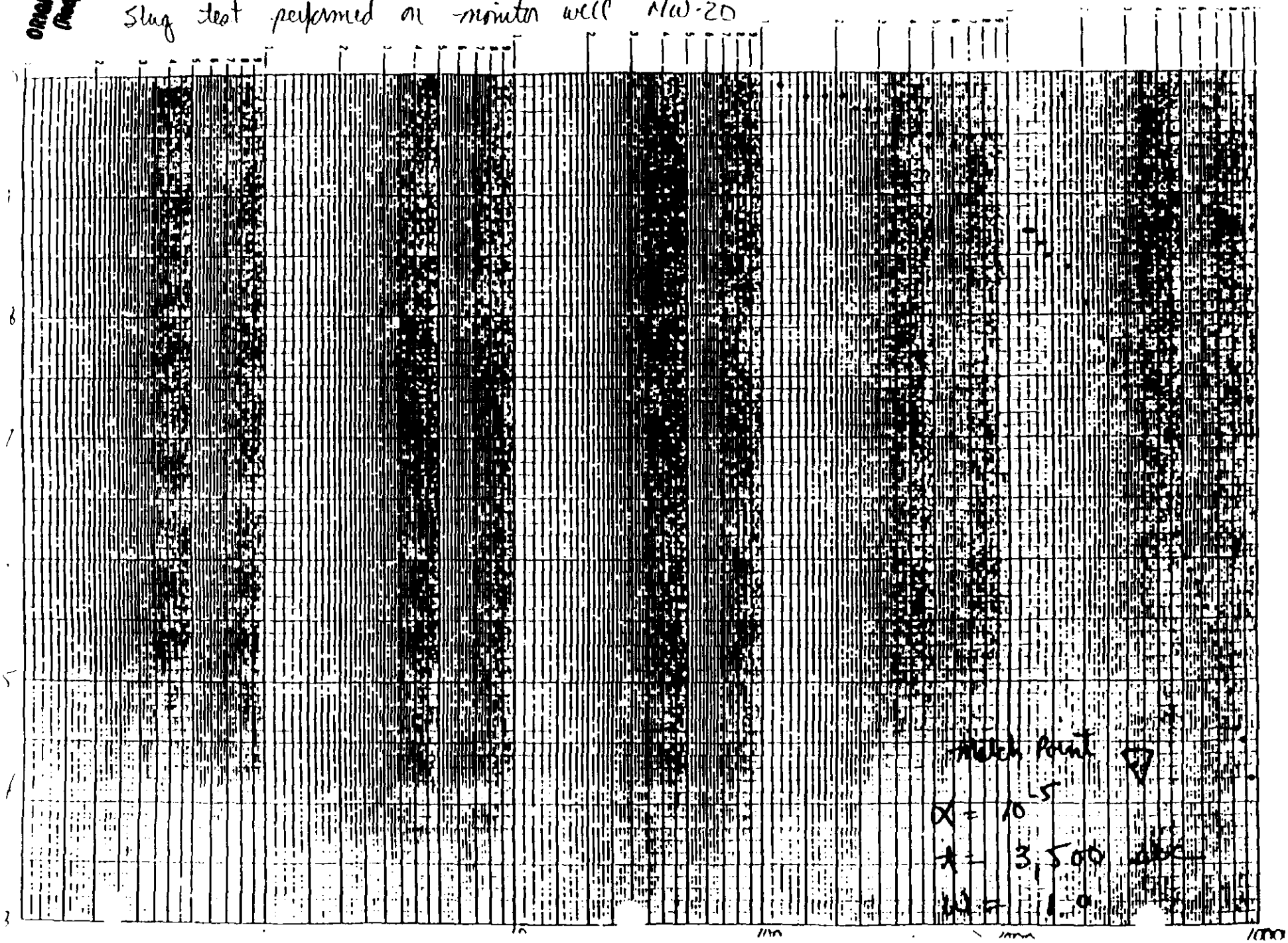
screen diameter = inch; R =



ORIGINAL (Red)

PAPADOPULOS METHOD

Slug test performed on monitor well MW-20



AR100950

Slug Test Data for Monitoring Well MW-30
Static Water Level - 24.43' Transducer Start - 2.77 / 6.29

time	H	ΔH	H/Ho	t (sec)
12:07:45	3.42			begin test
12:08:15	↓	3.41	.99	30
08:45		3.40	.99	60
12:09:15		3.38	.99	90
09:45		3.37	.99	120
12:10:15		3.36	.98	150
10:45		3.35	.98	180
12:11:15		3.34	.95	210
11:45		3.33	.97	240
12:12:15		3.32	.97	270
12:13:15		3.30	.97	300
12:14:15		3.28	.96	360
12:15:15		3.26	.95	420
12:16:15		3.24	.95	480
12:17:15		3.24	.95	540
12:18:15		3.22	.94	600
12:28:00		2.99	.97	1,185
12:29:00		2.97	.97	1245
12:30:00		2.95	.86	1305
12:31:00		2.93	.86	1365
12:32:00		2.92	.85	1425
12:37:00		2.86	.84	1725
12:42:00		2.76	.81	2025
12:47:00		2.65	.78	2325
12:52:00		2.59	.76	2625
12:57:00		2.52	.74	2925
13:02:00	↓	2.45	.72	3225

ORIGINAL
(Red)

min	H	ΔH	H/Ho	t (sec)
13:07:00	3.42	2.38	.70	3,525
13:12:00		2.31	.68	3,525
13:17:00		2.27	.66	4,125
13:22:00		2.20	.64	4,425
13:27:00		2.12	.62	4,725
13:32:00		2.06	.60	5,025
13:37:00		2.03	.59	5,325
13:42:00		2.00	.59	5,625
13:47:00		1.95	.57	5,925
13:52:00		1.96	.56	6,225
13:57:00		1.85	.54	6,525
14:02:00		1.80	.53	6,825
14:07:00		1.75	.51	7,125
14:12:00		1.70	.55	7,425
14:17:00		1.66	.49	7,725
14:27:00		1.58	.46	5,325
14:37:00		1.55	.45	8,925
14:47:00		1.43	.42	9,525

ORIGINAL
(Red)

GROUNDWATER TECHNOLOGY, INC.

DRILLING LOG

Continental White Cap
CLIENT

West Hazelton, PA
LOCATION

WELL CONSTRUCTION:

CASED FROM 0' TO 5' WITH 4" Galvanized
SCREENED FROM 5' TO 41' WITH .020" Slot 4" Galv
WELL DIAMETER 6"-Gravel 41'-3', Bentonite 3'-2'
OTHER Grout 2'-0'

WELL NUMBER: MW 1
TOTAL DEPTH: 41 feet
LOGGED BY: J. LaBarbera
DRILLER: Moyer Drill Co.
DRILL RIG: T4W
DRILL METHOD: Air Rotary
DATE DRILLED: 12/7/87

LITHOLOGICAL DESCRIPTION	REMARKS	PID
Brown, sandy CLAY with gravels		0
Brown to gray, clayey SAND		.50
Gray, small grained SANDSTONE	Bedrock at 11'	cuttings too wet to read
Coal seam to red silty		0
Red, argillaceous, unconsolidated SILTSTONE		48
Gray, argillaceous, unconsolidated SILTSTONE	Strong product odor at 35'	1

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY, INC.

DRILLING LOG

Continental White Cap
CLIENT

West Hazelton, PA
LOCATION

WELL CONSTRUCTION:

CASED FROM 0' TO 5' WITH 4" Galvanized
SCREENED FROM 5' TO 41' WITH .020" Slot 4" Galv
WELL DIAMETER 6"-Gravel 41'-1', Bentonite 1'-5'
OTHER Grout .5'-0'

WELL NUMBER: MW 2
TOTAL DEPTH: 41 feet
LOGGED BY: J. LaBarbera
DRILLER: Mover Drill Co.
DRILL RIG: T4W
DRILL METHOD: Air Rotary
DATE DRILLED: 12/7/87

LITHOLOGICAL DESCRIPTION	REMARKS	ppm
Red to brown/tan, sandy CLAY	Bedrock at 4'	0
Gray, medium grained, friable SANDSTONE		
Tan to gray, small grained SANDSTONE		.50
Dark gray, friable SILTSTONE	Strong product odor at 27'	63
		38
		5.50
Gray to red, clayey SANDSTONE		

0
10
20
30
40

AR100954

ORIGINAL

GROUNDWATER TECHNOLOGY, INC.

DRILLING LOG

Continental White Cap
CLIENT

West Hazelton, PA
LOCATION

WELL CONSTRUCTION:

CASED FROM 0' TO 5' WITH 4" Galvanized
SCREENED FROM 5' TO 41' WITH .020" Slot 4" Galv
WELL DIAMETER 6"-Gravel 41'-3', Bentonite 3'-2'
OTHER Grout 2'-0'

WELL NUMBER: MW 3
TOTAL DEPTH: 41 feet
LOGGED BY: J. LaBarbera
DRILLER: Mover Drill Co.
DRILL RIG: T4W
DRILL METHOD: Air Rotary
DATE DRILLED: 12/7/87

LITHOLOGICAL DESCRIPTION	REMARKS	PID	
Red to brown/tan, sandy CLAY		0	0
		.40	
Brown to light gray, quartzose SANDSTONE		160	10
	Strong product odor at 18'	130	
			20
	Bedrock at 23'	120	
Light gray, small grained SANDSTONE		15	
			30
Coal seam		0	
			40

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

DRILLING LOG.

CLIENT: Continental White Cap
LOCATION: West Hazelton, Pa

WELL CONSTRUCTION:
CASED FROM 0' TO 5.5' WITH 4" Galvanized
SCREENED FROM 5.5' TO 43' WITH .020" slot 4" Galvan.
WELL DIAMETER 7 5/8" - Gravel 43'-2', Bentonite 2'-1'
OTHER Grout 1'-0'

WELL NUMBER: MW 4
TOTAL DEPTH: 44 feet
LOGGED BY: J. LaBarbera
DRILLER: Mayer Drill Co.
DRILL RIG: THD
DRILL METHOD: Air Rotary
DATE DRILLED: 5/25/88

LITHOLOGICAL DESCRIPTION	REMARKS	PID
Asphalt, gravel, fill		
Red to brown, sandy CLAY with rock frags.		1
Brown to yellow, slightly sandy CLAY with very small sandstone rock fragments		2
Brown, slightly sandy CLAY with larger rock fragments		20
Gray SHALESTONE	No PID Readings because of adding water to control dust	20
Brown, slightly clayey SHALESTONE		
	Bedrock at 18'	
Gray, slightly fractured SHALESTONE		
	7 5/8" bit broke - changed to 6" bit at 30'	
Light gray		
Brown		
Gray		

ORIGINAL

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

DRILLING LOG.

Continental/White Cap — CLIENT
West Hazelton, Pa. — LOCATION

WELL CONSTRUCTION:
CASED FROM 0' TO 5' WITH 4" PVC
SCREENED FROM 5' TO 40' WITH .020" slot 4" PVC
WELL DIAMETER 7 3/8" — Gravel 40'-2', Bentonite 2'-1'
OTHER Grout 1'-0'

WELL NUMBER: MW 5 (Red)
TOTAL DEPTH: 41 feet
LOGGED BY: J. LaBarbera
DRILLER: Moyer Drill. Co.
DRILL RIG: THW
DRILL METHOD: Air Rotary
DATE DRILLED: 5/25/88

LITHOLOGICAL DESCRIPTION	REMARKS	PID
Asphalt, gravel, fill		
Brown, clayey SAND with sandstone rock fragments		0
Brown, sandy CLAY		4
Red, slightly silty, micaceous CLAY		90
Brown, slightly silty CLAY with some rock fragments		
COAL		
Tan to red, slightly silty CLAY	Slight moisture at 18'	110
Gray SHALE	Bedrock at 28'	11
Light gray, ~~smooth~~ Fine grained SANDSTONE		17
		15
		6

AR100957

GROUNDWATER TECHNOLOGY
CONSULTING GROUNDWATER GEOLOGISTS

DRILLING LOG.

Continental White Cap
CLIENT

West Hazelton, Penn
LOCATION

WELL CONSTRUCTION:
CASED FROM 0' TO 5' WITH 4" PVC
SCREENED FROM 5' TO 40' WITH .020" slot 4" PVC
WELL DIAMETER 7 5/8" - Gravel 40'-2', Bentonite 2-1'
OTHER Grout 1'-0'

WELL NUMBER: MW Deep
TOTAL DEPTH: 41 feet
LOGGED BY: J. LeBarbera
DRILLER: Mayer Drill. Co.
DRILL RIG: TH W
DRILL METHOD: Air Rotary
DATE DRILLED: 5/25/88

LITHOLOGICAL DESCRIPTION	REMARKS	PID
Asphalt, gravel, fill		
Brown, slightly sandy CLAY		0
Brown, slightly clayey, large grained SAND	Slight moisture at 9'	0
Light gray SANDSTONE	At 14' - lens of Tan to gray medium to large grained SANDSTONE with some clay	.20
Tan to grey small grained SANDSTONE with some clay		.10
Gray SANDSTONE Brown Gray Brown - large grained Gray - slightly fractured Red - large grained Gray - large to medium grained, fractured Red Brown Gray	Bedrock at 34'	.40 .20 .10 .20 0

AR100958

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Wholesale
PROJECT NAME:
PROJECT NUMBER: 302-000-PHK4
LOCATION: [redacted] Hazleton, Pa
DRILLER: Mayer

DATE 6/8/89 WELL NUMBER MW 7

CASED FROM 0' TO 10' WITH 4" PVC
SCREENED FROM 10' TO 40' WITH .02" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG TH W
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY J. LaBarbera

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			→ Asphalt, gravel		
			Light brown/red sandy CLAY with		
	5		varisized fractured Sandstone rock	0 ppm	
			fragments		
			→ Gray sandy CLAY w/above rock frags.		
			→ Red as above		
	10		→ Brown as above.	300 ppm	strong solvent odor
			→ Dark gray SILTSTONE		
			→ Brown/red SILTSTONE		
	15		Dark brown SILTSTONE	300 ppm	
				62 ppm	
	20				
					Water added for
			Dark gray SILTSTONE		dust control 5'-25'
	25			11 ppm	
			Brown SILTSTONE		Slight moisture
			Dark gray fractured SILTSTONE	22 ppm	25' to 40'
	30		→ COAL clean		
			Brown/red fractured SILTSTONE		
	35			1.2 ppm	
			Gray fractured silty SHALE		
	40			42 ppm	

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whitecap
PROJECT NAME:
PROJECT NUMBER: 302-000-8454
LOCATION: Hellertown, Pa
DRILLER: Mayer

DATE 6/2/89 WELL NUMBER MW 8

CASED FROM 0' TO 10' WITH 4" PVC
SCREENED FROM 10' TO 40' WITH .02" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG TH W
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY T. McBarbara

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			Asphalt, gravel		
			Tan/Brown, sandy CLAY with small gravels		
			Tan, sandy CLAY		
	5		Brown/Red sandy CLAY	85ppm	
			Light gray/Ark, weathered, subangular SANDSTONE	7ppm	Water added for dust control
	10		Light tan/Brown, competent SANDSTONE		
	15		Tan, competent Sandstone CONGLOMERATE	4ppm	Slight moisture at 18'
	20		Ark, competent SANDSTONE	188ppm	
	25		Brown/Gray, fine grained SAND with weathered subround SANDSTONE gravels	105ppm	Very strong solvent odor
	30		Gray, competent SANDSTONE	85ppm	
	35		Dark gray, competent SANDSTONE		Slightly fractured 34'
			Light brown SAND with small SANDSTONE gravels	7ppm	Strong solvent odor
	40		Brown competent SANDSTONE & Gray/Red competent SANDSTONE	20ppm	

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whitesap
PROJECT NAME:
PROJECT NUMBER: 302-000-8454
LOCATION: Hazleton, Pa.
DRILLER: Mayer

DATE 6/2/89 WELL NUMBER MW 9

CASED FROM 0' TO 10' WITH 4" PVC
SCREENED FROM 10' TO 40' WITH .02" slot PVC
WELL DEPTH 40' WELL DIAMETER 8"
ELEVATION
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

DRILL RIG TWW
DRILL METHOD Air Rotary
DATE(S) DRILLED 30 May 1989
LOGGED BY J. LaBarbara

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
			Asphalt, gravel		
			Light brown, sandy CLAY		
			SANDSTONE		
			Red, sandy CLAY with small gravels		
	5		Gray, as above	0 ppm	Water added for dust control
			Brown/Red competent SANDSTONE		
	10		Brown/Gray, micaceous SILTSTONE with small grained sand	0 ppm	
			Brown/Red slightly fractured SANDSTONE with some siltstone		Poorly cemented
	15			0 ppm	
			Gray, competent SANDSTONE		
	20		Brown/Red slightly fractured SANDSTONE	3 ppm	
			Gray SANDSTONE		
			Red, competent SANDSTONE		
			Dark gray SANDSTONE		
	25		Dark brown SANDSTONE	0 ppm	
			Light red/Pink, competent SANDSTONE	0 ppm	
	30		Light brown, coarse grained SAND		Water in at 31' approx. 5 gpm
			Brown/Gray, competent Sandstone CONGLOMERATE		No further PID readings taken
	35		Gray/White, as above		
	40				

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY, INC.

CLIENT: Continental Whitecap
PROJECT NAME:
PROJECT NUMBER: 302-000-8454
LOCATION: Hazleton, Pa.

DATE 6/2/89 WELL NUMBER MW 10
DRILLER: Moyer

CASED FROM 0' TO 10' WITH 4" PVC
DRILL RIG THW
SCREENED FROM 10' TO 40' WITH .02" slot PVC
DRILL METHOD Air Rotary
WELL DEPTH 40' WELL DIAMETER 8"
DATE(S) DRILLED 30 May 1989
ELEVATION
LOGGED BY J. LaBarbera
ANNULUS COMPLETION Gravel 40'-5' Bentonite 5'-4' Grout 4'-0'
OTHER

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
	0		→ Asphalt, gravel		No PID readings taken due to steady rains.
	2–6		Tan, sandy CLAY with small, subangular CONGLOMERATE rock fragments		
	7–9		Light tan as above.		
	10–12		Light gray/Pink as above		
	12–14		Yellow/Gray SAND with varisized subangular SANDSTONE rock fragments		
	15–18		Pink/Red SAND with varicolored, varisized SANDSTONE rock fragments		
	18–19		→ Dark red competent SANDSTONE		
	19–20		→ Gray, as above		
	20–35		Brown/varicolored, varisized very coarse grained, poorly cemented Sandstone CONGLOMERATE		
	35–40		Gray/White, as above		
	40				No odors noted

AR100962

GROUNDWATER TECHNOLOGY, INC.

CLIENT: CONTINENTAL WHITE CAP
PROJECT NAME: CONTINENTAL WHITE CAP
PROJECT NUMBER: 302-000-8484
LOCATION: VALMONT INDUSTRIAL PARK HAZLETON, PA
DRILLER: OLD FORGE DRILLING COMPANY

DATE JULY 23, 1989 WELL NUMBER MW-11

CASED FROM 0 TO 8'4" WITH 2" Sched 40 PVC DRILL RIG ACKER SOIL CENTURY - Skid rig
SCREENED FROM 8'4" TO 28'4" WITH 2" .020 SLOT DRILL METHOD HOLLOW STEM AUGER - DIAMOND CORE
WELL DEPTH 28'4" WELL DIAMETER 2" DATE(S) DRILLED JULY 22 & JULY 23, 1989
ELEVATION - LOGGED BY CURT HERMAN
ANNULUS COMPLETION #2 MORIE GRAVEL TO 6'; bentonite seal to 3' below ~~OTHER~~ grade; Portland cement 3' to 6"; flush mounted with locking manhole assembly

WELL DETAIL	DEPTH	GRAPHIC COLUMN	LITHOLOGICAL DESCRIPTION	SAMPLE	COMMENTS
	0-8 inches		Concrete		diamond core
	8" to 11'-3"		Light brown sand, fine to medium grained, well sorted, very dry. Hit competent rock at 11'-3"		hollow stem auger
	11'-3" to 18'-8"		Whitish grey competent sandstone consisting of quartz, minor amounts of feldspar and biotite. Ore contains vertical fractures (mins) through the core. * Sandstone includes some shale interbeds which are deteriorating within the sandstone bedding plane at approximately 55° x Sandstone is fining with depth and changing color to dark grey and blue grey.		Diamond coring of competent rock
	18'-8" to 28'-8"		Mottled grey and red shale Competent with vertical fracturing (mins) throughout the core.		

AR100963

EXHIBIT C

PAGE NO 1

PREPARED BY: D. Carcatta

DATE: 12/8/87

Continental White Cap

Proj. manager: Ray Fenstermacher

Well	DTW
1	15.09
2	15.33
3	11.36

All three wells were airlifted until the water pumped clear. All wells had an odor when airlifted. Wells will be sampled on Monday 12/14/87.

Note: All three wells were Grouted and manholes installed. Locking Caps were not installed at this time, will install when ordered and received.

1/13/88

Recorded by: J. LaBarbera

Well	DTW	Elev.	Elev. H_2O
1	18.71	1537.07	1518.36
2	18.72	1537.34	1518.62
3	12.63	1536.18	1523.55

Installed locking caps w/ locks

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 7-1

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	20.01			1537.07	1517.06	
2	19.97			1537.34	1517.37	
3	12.30			1536.18	1523.88	
4	10.25			1537.29	1527.04	
5	17.46			1534.33	1516.87	
6	18.80			1531.66	1512.86	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY: Hugh Hitchcock

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 10/26/88

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	20.15			1537.07	1516.92	No sample taken
2	20.51			1537.34	1516.83	Thin layer prod No Sample taken
3	14.27			1536.18	1521.91	Sampled
4	12.54			1537.29	1524.75	Sampled
5	14.79			1534.33	1519.54	Sampled
6	19.71			1531.66	1511.95	Sampled
Well #1	No sample taken,		During well Development Prod			
	was present in		well. Thin layer of prod			
	measured in suction sampler					

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS: Sampled Prod in 1

DATA RECORDED BY: Joseph S. Nicholson

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 20 September 1979

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	24.36			1537.07	1512.71	
2	24.01	23.96	.05	1537.34	1513.33	
3	13.39			1536.18	1522.79	
4	21.26			1537.29	1516.03	
5	26.92			1534.33	1507.41	
6	27.36			1531.66	1504.30	
7	19.68			1533.59	1513.91	
8	21.99			1533.55	1511.56	
9	28.16			1535.77	1507.61	
10	22.36			1534.95	1512.59	
11	24.12			1539.04	1514.92	
20	24.43			1538.47	1514.04	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS: Static levels before Slug Test on wells 4-5-6-F-20

DATA RECORDED BY: T. L. Bowerstein

GROUNDWATER TECHNOLOGY INC.

ORIGINAL (Red)

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 9/11/89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	23.31			1537.07	1513.76	strong odor
2	23.49			1537.34	1513.35	Strong odor
3	14.47			1536.18	1521.71	
4	22.23			1537.29	1515.06	
5	21.03			1534.33	1513.30	Strong odor
6	24.52			1531.66	1507.14	
7	19.77					Strong odor
8	19.86					
9	28.43					
10	25.54					
11	0					

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPM	ELEVATION	ELEV-W

REMARKS: Sampled Same day

DATA RECORDED BY: Joe McCarthy

AR100969

GROUNDWATER TECHNOLOGY INC.

(Red)

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 9/20/94

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	21.79			1537.07		957 AM
2	21.99			1537.34		10:01
3	14.13			1536.18		9:55
4	20.53			1537.29		10:02
5	18.94			1534.33		10:10
6	22.48			1531.66		10:12
7	18.75					10:18
8	17.97					10:19
9	26.85					10:24
10	18.50					10:11
11	Mudd					—
20	21.84					10:06

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPM	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY: D. CORCORAN

ORIGINAL
(Red)

GROUNDWATER
TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 8/29/89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	TIME	COMMENTS
1	21.71			1537.07	408	
2	21.97			1537.34	4:11	
3	36.31			1536.18	4:10	
4	20.39			1537.29	4:12	
5	18.73			1534.33	4:07	
6	22.35			1531.66	4:18	
7	18.70				4:06	
8	17.83				4.22	
9	26.84				4:25	
10	18.41				4:16	
11	Mud				—	
20	21.79				4:15	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY:

ORIGINAL (Red)

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 8/29/89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	TIME	COMMENTS
1	21.69			1537.07	3:12	
2	21.95			1537.34	3:10	
3	33.33			1536.18	3:04	.75 GPM - Pumping
4	20.37			1537.29	3:20	
5	18.73			1534.33	3:15	
6	22.35			1531.66	3.22	
7	18.67				3:18	
8	17.82				3:23	
9	26.85				3:30	
10	18.36				3:21	
11	Mud					
20	21.79				3:27	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS: EFFLUENT Samples taken @ 3:35 p.m.

DATA RECORDED BY: D. Corcoran

AR100972

GROUNDWATER TECHNOLOGY INC.

ORIGINAL (Red)

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 29 AUG 89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	ELEV-W	COMMENTS
1	21.70			1537.07	1515.37	11:18
2	21.97			1537.34	1515.37	11:15
3	13.59			1536.18	1522.59	11:07
4	20.36			1537.29	1516.93	11:08
5	18.69			1534.33	1515.64	11:10
6	22.36			1531.66	1509.30	11:13
7	18.69			1533.59	1514.90	10:55
8	17.82			1533.55	1515.73	10:57
9	26.86			1535.77	1508.91	10:59
10	18.39			1534.95	1516.56	11:02
11	Mud - No H_2O - APPOX. 15' TO Mud			1529.04		11:30
20	21.81			1538.47	1516.66	11:35

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPM	ELEVATION	ELEV-W

REMARKS: THESE ARE Static levels - Before PUMP WAS turned on.

DATA RECORDED BY: D. CORCORAN

ORIGIN. (Red)

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton. Pa.
DATE: 8/29/89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	TIME ~~ELEV-W~~	COMMENTS
1				1537.07		
2				1537.34		
3				1536.18		.75 GPM - Pump.
4	20.38			1537.29	12.10 PM	
5	18.69			1534.33	12.14 PM	
6	22.36			1531.66	12.16 PM	
7	18.67				12.15 PM	
8	17.81				12.13 PM	
9	26.86				11.22 PM	
10	18.39				12.12 PM	
11	Mud					
20	21.80				12.25 PM	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPM	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY: D. Corcoran

AR100974

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 8/29/89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	TIME ~~PUMP #~~	COMMENTS
1	21.70			1537.07	12:31	
2	21.95			1537.34	12:32	
3	31.47			1536.18	12:30	Pumping well @ 75GPM
4	20.37			1537.29	12:35	
5	18.69			1534.33	12:37	
6	22.36			1531.66	12:42	
7	18.66				12:47	
8	17.80				12:52	
9	26.86				12:57	
10	18.39				12:45	
11	Mud				—	
20	21.78				103	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPM	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY: D. COCCIA

GROUNDWATER TECHNOLOGY INC.

LIQUID LEVEL MEASUREMENTS
CLIENT: Continental White Cap
LOCATION: Hazelton, Pa.
DATE: 8-29-89

OBSERVATION WELLS

NO.	DTW	DTP	PT	ELEVATION	~~ELEV-W~~ TIME	COMMENTS
1	21.70			1537.07	107 PM	
2	21.95			1537.34	108	
3	31.78			1536.18	109 "	.75 GPM'S
4	20.36			1537.29	115 "	
5	18.69			1534.33	113 "	
6	22.36			1531.66	111 "	
7	18.66				116 "	
8	17.60				112 "	
9	26.26				117 "	
10	18.38				110 "	
11	Mud				— "	
20	21.80				121 "	

RECOVERY WELL (S)

NO.	DTW (SETTING)	DTP (SETTING)	GPH	ELEVATION	ELEV-W

REMARKS:

DATA RECORDED BY:

ORIGINAL (Red)

Environmental Resources Management

Drilling Log

Project Continental White Cap Owner Pepper Hamilton & Scheetz

Location W. Hazleton PA W.O. Number 336-02

Well Number MW-20 Total Depth 55 ft Diameter 6"

Surface Elevation — Water Level: Initial — 24-hrs. —

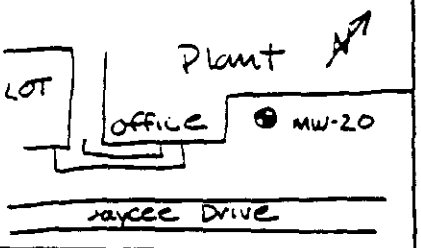
Screen: Dia. NA Length NA Slot Size NA

Casing: Dia. 6" Length 19 ft Type Steel

Drilling Company Stackhouse & Son Drilling Method Air Hammer

Driller Dave Stackhouse Log By Jim LaRegina Date Drilled 7 July 89

Sketch Map



Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
0				0-6' Grey medium sandstone, weathered
				6-7' Yellow/orange sandstone, weathered
10				7-12.5' Grey sandstone, iron stained weathered joints
				12.5-19' Grey to black medium sandstone, trace mica. Top of bedrock @ 19'
20				19-22' same as above
				22-26' Brown arkosic sandstone with angular quartz fragments, iron stained. weathered, moist.
30				26-33' Dark grey, coarse sandstone, trace mica
				33-41.5 Dark grey to black coarse sandstone with trace of coal
50				41.5-46 Dark grey to black conglomeratic sandstone.
60				

Environmental Resources Management

Drilling Log

Project Continental White Cap Owner Pepper Hamilton + Scheetz

Location W. Hazleton PA W.O. Number 336-02

Well Number MW-20 Total Depth 55 ft Diameter 6"

Surface Elevation — Water Level: Initial — 24-hrs. —

Screen. Dia. NA Length NA Slot Size NA

Casing: Dia. 6" Length 19 ft Type Steel

Drilling Company Stackhouse + Son Drilling Method Air Hammer

Driller Dave Stackhouse Log By Jim LaRegina Date Drilled 17 July 89

Sketch Map

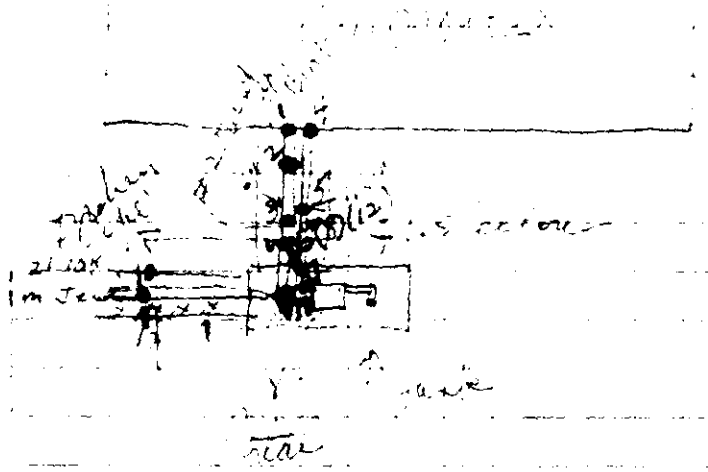
Notes

Depth (Feet)	Graphic Log	Well Construction	Sample Number	Description/Soil Classification (Color, Texture, Structures)
				46-48' Grey sandstone weathered dark brown with iron staining. Moist.
				48-55' Dark grey medium sandstone
				well Construction
				0-19' 8 3/4" bore hole
				0-19' 6" steel casing tremie grouted in place with cement/bentonite mix. Well completed with locking flush mount cap.
				19-55' 6" open borehole
				1250 hrs Well completed
				1348 hrs SWL 55' BLS
				1600 hrs SWL 48' BLS
				estimated yield < 1 gpm

AR100978

APPENDIX C

ORIGINAL
(Red)



Sample #	Legal Seal	Location	Analysis Sample	date
22022 7	049729	Plant Discharge 4"	VO	11-16-87
220228	049732	#1 Joint - 4"	VO	11-16-87
220229	049731	#2 Joint - 4"	VOA	11-16-87
22023	049722	#1 - 1.5" Joint	VOA	11-16-87
22021	049730	#2 - 1.5" - coupling	VOA	11-16-87
220232	049728 →	3" #1 - could have been broken by backhoe	VOA	11-16-87
220233	049727	1.5" - tank [illegible]	VOA	11-16-87
[illegible]34	049723	Lately Sam [illegible] Garden pipe	VOA	"
220235	049726	Composite Kelleway 3' Centers [illegible]	"	"
220236	049727	Coupling - 2/3" from elbow	"	"
220237	049721	4 1/2" elbow at tapy tank		
220238	049724	[illegible] break		

Continued on Page

Left site at 1:30 PM - [illegible] Western Engineering

Date | Signed | Date

Lab Number CCli-7559

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
[illegible]	[illegible]	[illegible]	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
[illegible]	[illegible]	[illegible]	[illegible] 425-2553	—	050

CARD (3)	ID CODE/ALL CARDS 4-16 (Cnty, Mun, T, Est, Case, Fac)	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24 (M D Y)	TIME 25-28 (Hr Min)	KIND 29
1 / 2			0	11 16 87	09 50	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	7CW	022023	1	

FULL DESCRIPTION WHERE SAMPLE TAKEN

[illegible] sampling container for organic analysis. Refer to 50115 / Laboratory Update #2 — [illegible] VOA

ADDITIONAL LAB ANALYSES

→ CUSTODY LOG

How Shipped [illegible] Date 11-16-87

Legal Seal No 647730

Received by

Legal Seal Condition [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GCMS detection limit ~50 µg/kg.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINE)
Trichloroethylene	µg/Kg.		70.

AR100981

ANALYST: [signature] SIGNATURE DATE 11/18/87

2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Lab Number CW-7558

Date Received 11/17/87

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
			220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
					550

CARD (3)	ID CODE (ALL CARDS) 4-16 (Cnty, Mun, T, Est, Case, Fac)	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24 (M D Y)	TIME 25-28 (Hr Min)	KIND 29
			0	11 16 87	09 45	

SGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	220213	0	

FULL DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

Sample for requested analysis. Refer VOA to Laboratory Analysis #2 [illegible]

CUSTODY LOG

How Shipped [illegible] Date 11-16-87

Legal Seal No 049722

Received by

Legal Seal Condition [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

VOA detection limit ~ 50 µg/kg.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Tetrachlorethylene	µg/kg.		< 200.

ANALYST [signature] SIGNATURE DATE 11/18/87

AR100982

ORIGINAL

Lab Number CW-7552 (Bed)

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

BLISHMENT	CASE	FACILITY	COLL NUMBER
			1220

DUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
					GSC

CARD (1)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
	Cnty Mun T Est Case Fac			M D Y	Hr Min	
2		0		11/16/87	09 35	

IS O 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	7C	12240	22-5	

FULL DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

CUSTODY LOG

How Shipped Courier Date 11/16-87

Seal No 849732

Received by

Seal Condition

VOA / Soils

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Trimethylamine	mg/kg		3.50

ANALYST Francis Kim
SIGNATURE

DATE 11/18/87

Lab Number [illegible]-75[illegible]

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
			220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
					05

CARD (3)	D CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
1 2	Cnty Mun T Est Case Fac		0	M D Y	Hr Min	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
		[illegible] 2313		

FILL DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

[illegible] EPA

[illegible] soils.

CUSTODY LOG

How Shipped [illegible] Date 11-16-87

Legal Seal No [illegible]

Received by

Legal Seal Condition [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

[illegible]

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
[illegible]	mg/kg.		[illegible] 7.0 C.

ANALYST [illegible] SIGNATURE

DATE 11/18/87

AR100984

2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Lab Number 7563
Date Received 11/17/87

ESTABLISHMENT | CASE | FACILITY | COLL NUMBER 0220

COUNTY | MUNICIPALITY | PROGRAM | COLL NAME/PHONE NUMBER | TYPE TR | STD ANALYSIS 650

CARD (3) | ID CODE (ALL CARDS) 4-16 Cnty Mun T Est Case Fac | LATITUDE 4-10 | LONGITUDE 11-18 | DATE 19-24 M D Y 11 16 87 | TIME 25-28 Hr Min 10 55 | KIND 29

IS Q 30 34 | BUREAU 35-37 AMIS 701 | SAMPLE NUMBER 38-43 220235 | STREAM NAME 44-57 | RELATIVE POINT 58

FULL DESCRIPTION WHERE SAMPLE TAKEN | ADDITIONAL LAB ANALYSES

CUSTODY LOG

How Shipped | Date 11-16-87

Seal No. 00726

Received by

Legal Seal Condition

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detection limit 50 mg/kg

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Trichloroethylene	mg/kg		< 50

ANALYST [signature] SIGNATURE DATE 11/18/87

AR100985

ER LAB 31
1/83

2

Lab Number 0W-7565

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
[illegible]	[illegible]	[illegible]	220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
[illegible]	[illegible]	[illegible]	[illegible] 257-2553	—	050

CARD (3)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
2	Cnty / Mun / T / Est / Case / Fac		0	M D Y: 11 16 87	Hr Min: 11 15	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	7 [illegible]	022023		

FULL DESCRIPTION WHERE SAMPLE TAKEN: Mixing sampling container for requested analysis. Refer to Soils/. Laboratory Update #2, [illegible] 10A.

ADDITIONAL LAB ANALYSES

CUSTODY LOG

How Shipped: [illegible] Date: 11/16/87

Legal Seal No: [illegible]

Received by:

Legal Seal Condition: [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detection limit ~50 µg/kg

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Trichloroethylene	µg/kg		~ 6000.

AR100986

[signature] SIGNATURE DATE 11/15/87

ORIGINAL

Lab Number C-Kee-75

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS

CARD (3)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
1 2	Cnty | Mun | T | Est | Case | Fac		0	M D Y	Hr Min	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	20/	212C23		

FULL DESCRIPTION WHERE SAMPLE TAKEN: Impeptic Sampling Manhole VCA

ADDITIONAL LAB ANALYSES: per original analysis - Refer to Laboratory Update #2

CUSTODY LOG

How Shipped: Courier Date: 11-16-87

Legal Seal No: 49724

Received by:

Legal Seal Condition: Unbroken

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

CCl4 detected Tentatively - Below CRQL 5.0 mg/kg (ppm)

CCl4 detection limit ~ 5.0 mg/kg.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)

ANALYST: Susan C. Rice (SIGNATURE) DATE: 11/18/87

Lab Number OKC-7557

Date Received 11/17/87

2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
[illegible]	[illegible]	#2 Joint 4th Line	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
[illegible]	[illegible]	[illegible]	[illegible] 4257-2553	0	050

CARD (3)	ID CODE (ALL CARDS) 4-16 (Cnty, Mun, T, Est, Case, Fac)	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24 (M D Y)	TIME 25-28 (Hr Min)	KIND 29
2			0	11 16 87	09 40	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	022022 29		

FULL DESCRIPTION WHERE SAMPLE TAKEN [illegible] sampling container for [illegible] analysis. [illegible] #2 [illegible]

ADDITIONAL LAB ANALYSES VOA / Soils

CUSTODY LOG

How Shipped [illegible] Date 11/16/87

Legal Seal No. C49731

Received by

Legal Seal Condition [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

[illegible] detection limit ~ 50 µg/kg.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Trichloroethylene	µg/kg		1800.

[illegible] SIGNATURE

DATE 11/18/87

AR100988

ORIGINAL (Red)

Lab Number CAL-7555

Date Received 11/17/87

2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
[illegible]	[illegible]	Plant Discharge 4" Pipe	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
[illegible]	[illegible]	106	[illegible] 425-2553	C	050

CARD (3)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24 (M D Y)	TIME 25-28 (Hr Min)	KIND 29
2			0	11 16 87	09 30	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	0220227		

FULL DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

Improper sampling container for quantitative analysis - Refer to Laboratory Update #2 Soils / VOA

CUSTODY LOG

How Shipped: Circulator Date 11-16-87

Legal Seal No: C49729

Received by:

Legal Seal Condition: [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detection limit ~ 50 µg/kg.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Trichloroethylene	µg/kg.		~ 1100.

AR100989

SIGNATURE [signature] DATE 11/18/87

2

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Lab Number [illegible] - 752[illegible]
Date Received 11/17/87

ESTABLISHMENT	CASE	FACILITY	COLL NUMBER
[illegible]	[illegible]	[illegible]	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
[illegible]	[illegible]	[illegible]	[illegible] 2553	C	050

CARD (3)	ID CODE (ALL CARDS) 4-16: Cnty, Mun, T, Est, Case, Fac	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24 (M D Y)	TIME 25-28 (Hr Min)	KIND 29
1 / 2			0	11/16/87	1000	

SGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	0220237		

FULL DESCRIPTION WHERE SAMPLE TAKEN
[illegible] sampling container for requested analysis. Refer to Laboratory [illegible] #2

ADDITIONAL LAB ANALYSES
VOA / Soils

CUSTODY LOG
How Shipped: [illegible] Date: 11-16-87
Legal Seal No: C49725
Received by:
Legal Seal Condition: [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detected Trichloroethylene at ~1800. mg/kg (ppm)

GC/MS detection limit ~10. mg/kg.

QUANTITATIVE RESULTS

ANALYSIS: UNITS: ANALYSIS CODE RESULTS (SHOW DECIMAL POINTS ON LINES)

SIGNATURE [illegible] DATE 11/15/87

AR100990

Lab Number CAA-7562

Date Received 11/17/87

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

(BUSINESS)	CASE	FACILITY	COLL NUMBER
			0220

NTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS

CARD (3)	ID CODE (ALL CARDS) 4-16						LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24			TIME 25-28		KIND 29
1 2	Cnty	Mun	T	Est	Case	Fac			M	D	Y	Hr	Min	
								0	11	16	87	10	25	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	760	012346		

L DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

CUSTODY LOG

Shipped Date 11-16-87

Seal No 049723

Received by

Seal Condition

QA/Soils

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

CHMS detected Trichloroethylene in the percent range.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)

SIGNATURE

DATE 11/18/87

(B-131)

1

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Lab Number: [illegible]
Date Received: 10/23/87

ESTABLISHMENT: [illegible] | CASE: [illegible] | FACILITY: [illegible] | COLL NUMBER: 0220

CITY: [illegible] | MUNICIPALITY: [illegible] | PROGRAM: [illegible] | COLL NAME/PHONE NUMBER: [illegible] 252553 | TYPE TR: C | STD ANALYSIS: 050

CARD (8) | ID CODE (ALL CARDS) 4-16: Cnty, Mun, T, Est, Case, Fac | LATITUDE 4-10 | LONGITUDE 11-18 | DATE 19-24: M D Y 10 22 87 | TIME 25-28: Hr Min 0200 | KIND 29

USGS Q 30 34 | BUREAU 35-37 AMIS: 701 | SAMPLE NUMBER 38-43: 022011 99 | STREAM NAME 44-57: GW | RELATIVE POINT 58

FULL DESCRIPTION WHERE SAMPLE TAKEN

ADDITIONAL LAB ANALYSES

CUSTODY LOG
Shipped: [illegible] Date: 10-22-87
Legal Seal No: 272511/272512
Received by:
Legal Seal Condition: intact [illegible]

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

* TCE result is an approximate quantitation. Not run in dilution.

GC/MS detection limit ~1.0 µg/l.

QUANTITATIVE RESULTS

ANALYSIS:	UNITS:	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
1,1 Dichloroethylene	µg/l		10.
1,1 Dichloroethane	µg/l		5.7
1,1,1 Trichloroethane	µg/l		240.
Trichloroethylene	µg/l		* 2200.
1,1,2 Trichloroethane	µg/l		4.0
cis-1,2 Dichloroethylene	µg/l		28.

ANALYST: [signature] SIGNATURE
DATE: 10/23/87

AR100992

AB-131

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Lab Number ORG 7671

Date Received 11/20/87

ASSIGNMENT	CASE	FACILITY	COLL NUMBER
Chromated	Valmont Park	Fisher B680	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
Luzerne	Hazle Twp	106	Gadinski 455-2553	O	050

CARD (80)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
1 / 2	Cnty / Mun / T / Est / Case / Fac			M D Y	Hr Min	
		0		11 1987	0230	

USGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	022024 9		

DESCRIPTION WHERE SAMPLE TAKEN

*Caution - Sample taken from tubes containing concentrated organics

ADDITIONAL LAB ANALYSES

VOA - 10 highest peaks

CUSTODY LOG

Shipped Purolator Date 11-19-87

Seal No 049823 / 849822

Received by

Seal Condition intact SK

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detected Trichloroethylene est ~ 720. mg/L (ppm)

GC/MS detection limit ~ 50. mg/L.

QUANTITATIVE RESULTS

ANALYSIS: UNITS: ppb

ANALYSIS		ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Methylene chloride	mg/L		600.
1,1 Dichloroethylene	mg/L		65.
1,1 Dichloroethane	mg/L		300.
1,1,1 Trichloroethane	mg/L		3700.
Toluene	mg/L		840.
SK [redacted]			[redacted]

Susan C. Kim
SIGNATURE

DATE 11/24/87

AR100993

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF LABORATORIES
SPECIAL ANALYSES REPORT

Date Received 11/20/87

ABLISHMENT	CASE	FACILITY	COLL NUMBER
Thermatex	Valmont Park	Tanker #701	0220

COUNTY	MUNICIPALITY	PROGRAM	COLL NAME/PHONE NUMBER	TYPE TR	STD ANALYSIS
Wayne	Hazle twp	106	Gadomski 425-2553	0	050

CARD (3)	ID CODE (ALL CARDS) 4-16	LATITUDE 4-10	LONGITUDE 11-18	DATE 19-24	TIME 25-28	KIND 29
	Cnty Mun Est Case Fac			M D Y	Hr Min	
			0	11 19 87	0215	

SGS Q 30 34	BUREAU 35-37 AMIS	SAMPLE NUMBER 38-43	STREAM NAME 44-57	RELATIVE POINT 58
	701	022048	Tube	

FULL DESCRIPTION WHERE SAMPLE TAKEN

* Caution - sample taken from Tanker Contained Organics

ADDITIONAL LAB ANALYSES

VOA - 10 highest peaks

CUSTODY LOG

How Shipped Parcelcar Date 11-19-87

al Seal No 049824 / 049821

ceived by

nal Seal Condition Mark Rice

QUALITATIVE REPORT

DO NOT WRITE BELOW THIS LINE

GC/MS detected 1,1,1 Trichloroethane at ~ 23. mg/l. (ppm) and Trichloroethylene at 3500. mg/l. or 3.5 parts per Thousand.

GC/MS detection limit ~ [redacted] 1.0 mg/l.

QUANTITATIVE RESULTS

ALYSIS:	UNITS: ppm	ANALYSIS CODE	RESULTS (SHOW DECIMAL POINTS ON LINES)
Methylene chloride	mg/l.		4.0
1,1 Dichloroethane	mg/l.		1.7
Toluene	mg/l.		1.0

ANALYST Mark C. Rice (SIGNATURE) DATE 11/24/87

AR100994